Fishery Management Report No. 97-2

Area Management Report for the Recreational Fisheries of the Kodiak and Alaska Peninsula/Aleutian Islands Regulatory Areas, 1996

by

Len Schwarz

June 1997

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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June 1997

The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Distribution is to state and local publication distribution centers, libraries and individuals and, on request, to other libraries, agencies, and individuals. This publication has undergone regional peer review.

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This document should be cited as:
Schwarz, L. 1997. Area management report for the recreational fisheries of the Kodiak and Alaska Peninsula/Aleutian Islands regulatory areas, 1996. Alaska Department of Fish and Game, Fishery Management Report No. 97-2, Anchorage.

PREFACE

This report is divided into two sections. *Section I* presents an introductory overview of the Kodiak Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; a historical perspective of recreational angler effort and harvest within management area waters; an approximation of the economic value of the recreational fisheries of the management area; a general description of stocking, research, management, and access activities being conducted in the management area; and a summary of the major fishery and social issues that presently occur in the Kodiak Management Area. Recommendations for solving these social issues including, but not limited to, research, management, access, regulatory changes, stocking, or habitat options are also presented. *Section II* provides a more detailed summary of all the major fisheries that occur in the Kodiak Management Area. Included in this section are a description and historical perspective of each fishery, the objective governing the management of each fishery (if any have been established), description of the recent performance of each fishery, a description of recent Board of Fisheries actions with respect to each fishery, a description of any social or biological issues surrounding each fishery, and a description of any ongoing or recommended research or management activities directed at each fishery. None of the sport fisheries in the Kodiak Management Area have fisheries management plans associated with them and usually are not restricted by emergency order inseason. Inseason management approaches are discussed for applicable fisheries. If information is available, the fishery outlook for the immediate future is presented.

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SECTION I: MANAGEMENT AREA OVERVIEW

Section I presents an introductory overview of the Kodiak Management Area. Included in this section are a general geographic and organizational description of the management area; an overview of the Alaska Board of Fisheries processes and schedules for the management area; an inventory of the available fishery resources of the management area; an historical perspective of recreational angler effort and harvest within management area waters; an approximation of the economic value of the recreational fisheries of the management area; and a general description of stocking, research, management, partnership, aquatic education, viewing, and access activities being conducted in the management area.

MANAGEMENT AREA DESCRIPTION

The Kodiak sport fish management area (KMA) includes all waters of the Kodiak Island Archipelago, the Alaska Peninsula south of a line from Cape Douglas to Cape Menshikoff, and the Aleutian Islands (Figure 1). This management area is comprised of two sport fishing regulatory areas: the Kodiak Regulatory Area and the Alaska Peninsula/Aleutian Islands Regulatory Area. With the exception of the road accessible streams located in Kodiak, Adak, Cold Bay, and Dutch Harbor, virtually all sport fisheries in the KMA are remote and relatively difficult to access. A coastal climate with high precipitation and mild temperatures characterize much of the KMA.

Principal land managers in the KMA include the U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, various native corporations, and the State of Alaska. The communities of Kodiak and Dutch Harbor/Unalaska, with populations of 14,600 and 4,300, respectively, are the two largest communities. The area also includes approximately 20 villages with year-round inhabitants. A major U.S. Navy Base on Adak Island is in the process of closing, and the past population of 5,000 people was reduced to 100 people in 1995. The base is scheduled for complete closure in 1997.

Management and research functions for the KMA are based in the Kodiak area office. The Division of Sport Fish staff stationed in Kodiak include one permanent full time Fisheries Biologist III (Len Schwarz) and one permanent full time clerical position (Doris Mensch) which is shared with the Division of Wildlife Conservation staff. The Fisheries Biologist III position acts as the area management biologist and the project leader for all area research projects. This position is assisted by one permanent seasonal Fisheries Biologist I position (Tim Motis) who acts as crew leader for two of the three area research projects and by six supporting permanent-seasonal technicians. Support is also provided to the area staff from the Sport Fish Division Research and Technical Services (RTS) staff.

ALASKA BOARD OF FISHERIES ACTIVITIES

The process of developing fishing regulations appropriate for fisheries in the KMA occurs within the established Alaska Board of Fisheries process. Public input concerning regulation changes and allocation issues is provided for in this process through various means including direct testimony to the Board of Fisheries and through participation in local fish and game advisory committees. These advisory committees have been established throughout Alaska to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes. Most active committees meet at least once each year, usually in the fall prior to the

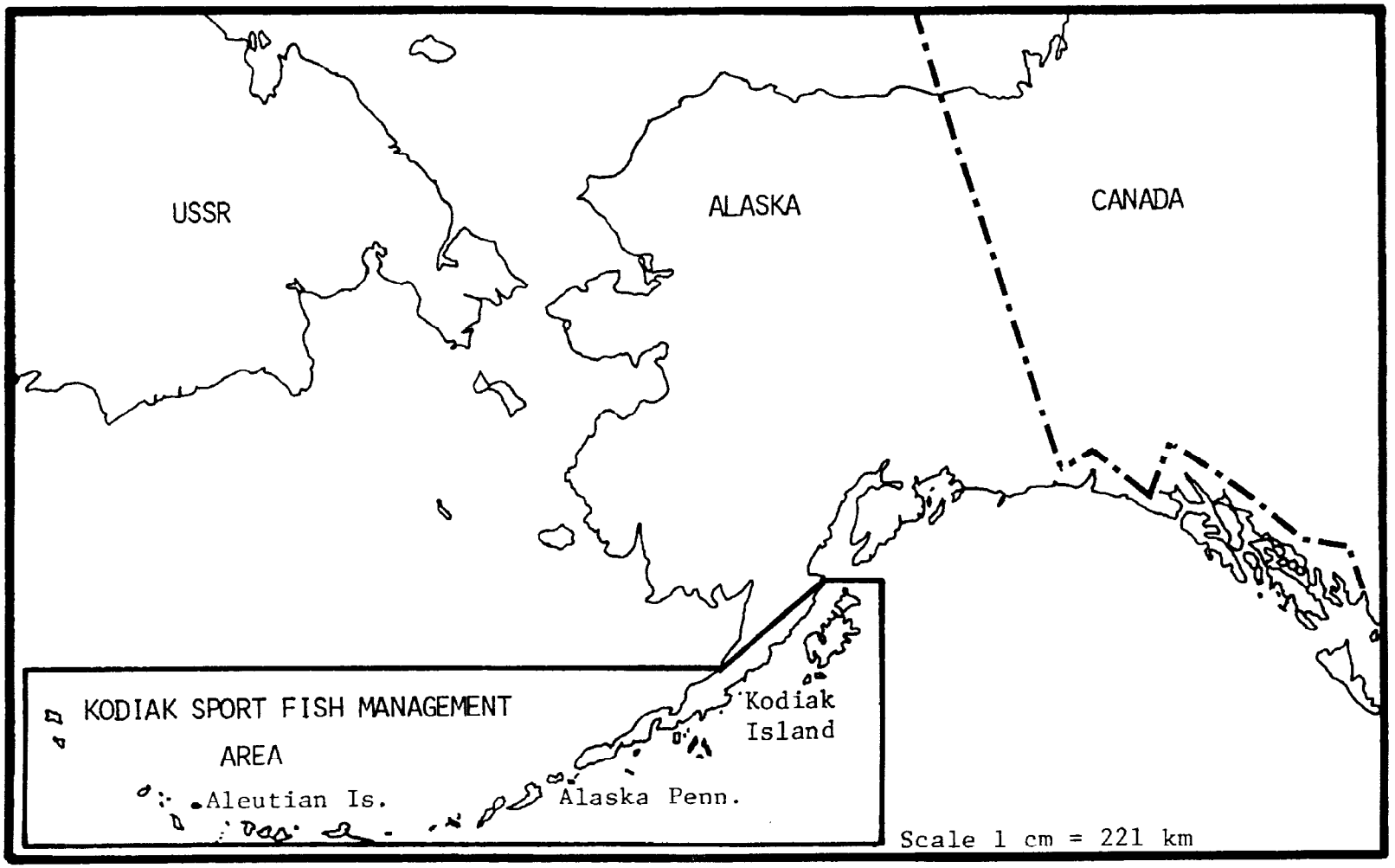

Figure 1.-The Kodiak Management Area: Kodiak Island Archipelago, Alaska Peninsula, and Aleutian Islands.

Board meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow for direct public interaction with staff involved with resource issues of local concern. Within the KMA there are seven fish and game advisory committees: Chignik, False Pass, King Cove, Kodiak, Nelson Lagoon, Sand Point, and Dutch Harbor/Unalaska.

Under the current operating schedule, the Board of Fisheries meets on a 3-year cycle. Alaska Peninsula/Aleutian Island proposals will be heard during the 1997/1998 winter meetings. Proposals regarding the Kodiak Regulatory Area will be heard during the 1998/1999 winter meetings.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing KMA waters can target all five species of North American Pacific salmon (pink *Oncorhynchus gorbuscha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*) in both fresh and salt water. In addition, there are saltwater sport fisheries for halibut *Hippoglossus stenolepis*, rockfish *Sebastes* and lingcod *Ophiodon elongatus*. There are also fisheries for Dolly Varden *Salvelinus malma*/Arctic char *Salvelinus alpinus* and steelhead/rainbow trout *O. mykiss* as well as fisheries for stocked landlocked coho and Arctic grayling *Thymallus arcticus*.

The Division of Sport Fish classifies sport fisheries into one of three levels based on a combination of yield (harvest) and angler-cost criteria. Level 1 fisheries are defined as high yield, low angler-cost fisheries. These fisheries are typically entry level fisheries that anglers can participate in at little direct cost. Level III fisheries are defined as low yield, high cost fisheries. These fisheries are typically remote, guided, or special management fisheries that have a high cost associated with participation. Level II fisheries fall between Level I and Level III fisheries and are defined as basic yield, intermediate-cost fisheries.

The KMA offers diverse fishing opportunities for the recreational angler. Stocked lakes and road-accessible salmon and Dolly Varden fisheries near the cities of Kodiak and Dutch Harbor provide Level I fisheries. Marine waters near Kodiak and Unalaska islands offer Level II fisheries for halibut and rockfish. Another example of a Level II fishery in the KMA is boat-accessible salmon fisheries on Afognak Island. Remote steelhead trout and chinook salmon stocks, such as those in the Karluk and Ayakulik rivers, which are accessible by aircraft, offer Level III fisheries.

RECREATIONAL ANGLER EFFORT

From 1977 through 1995[1] an average of 97,810 angler-days have been expended by recreational anglers fishing KMA waters (Table 1). Recreational angler effort increased annually from 1977 through 1982, after which effort generally stabilized between 90,000 and 110,000 angler-days through 1990. The estimated sport effort for the KMA peaked during 1991 with 139,480 angler days (Mills 1992). The 1995 effort of 99,180 angler days was the lowest on record since 1988 and almost 13,000 angler-days below the recent 10-year average (Mills 1987-1994, Howe et al. 1995 and 1996).

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[1] Effort and harvest figures cited in this report are from Mills 1979-1994 and Howe et al. 1995, unless otherwise noted. Effort and harvest figures presented in Howe et al. 1996 are found in Appendix J. Numbers presented in the text throughout this report have been rounded off to the nearest ten. Numbers in the tables represent the actual number of the count or estimate.

Table 1.-Number of angler-days of effort expended by sport anglers fishing Kodiak Management Area waters, 1977-1995.

	Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area						
	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total		KMA
Year	Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA	Ang-Days	Percent	Ang-Days	Percent	Total	% of KMA	Total
1977					11,581	22	14,957	36	26,606	64	41,563	78	53,144
1978					8,766	12	19,063	43	25,439	57	44,502	84	53,268
1979					12,969	18	23,124	39	35,921	61	59,045	82	72,014
1980					19,760	23	27,646	43	37,261	57	64,907	77	84,667
1981	11,828	44	15,378	57	27,206	29	29,857	45	36,582	55	66,439	71	93,645
1982	9,075	37	15,439	63	24,514	23	41,113	51	40,125	49	81,238	77	105,752
1983	8,035	46	9,329	54	17,364	17	40,217	47	46,237	54	86,454	83	103,818
1984	10,428	57	8,038	44	18,466	18	34,213	41	48,447	59	82,660	82	101,126
1985	3,153	24	9,899	76	13,052	13	33,032	39	51,809	61	84,841	87	97,893
1986	6,479	30	14,834	70	21,313	22	31,762	41	45,404	59	77,166	78	98,479
1987	7,445	32	15,874	68	23,319	24	38,671	51	36,979	49	75,650	76	98,969
1988	8,484	38	13,822	62	22,306	24	30,522	44	38,803	56	69,325	76	91,631
1989	11,420	46	13,286	54	24,526	22	35,485	41	50,857	59	86,342	78	110,868
1990	16,057	46	18,537	54	34,594	30	34,969	43	46,634	57	81,603	70	116,197
1991	20,851	49	21,793	51	42,644	31	42,668	44	54,166	56	96,834	69	139,478
1992	13,903	61	8,802	39	22,705	21	36,485	43	48,292	57	84,777	79	107,482
1993	14,774	70	6,192	30	20,966	18	41,762	45	51,558	55	93,320	82	114,286
1994	10,673	62	6,608	38	17,281	15	44,312	45	54,820	55	99,132	85	116,413
1995	9,059	84	4,593	16	13,652	11	40,042	47	45,487	53	85,529	89	99,181
MEAN [a]	10,778	49	11,236	51	20,894	21	33,679	43	40,814	57	76,912	79	97,805

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Historically, nearly 80% of the total recreational angler effort from the KMA has occurred in the waters of the Kodiak Regulatory Area. From 1977 through 1995, waters of the Kodiak Regulatory Area have supported an average of 76,910 angler-days of sport fishing effort (Table 1). In comparison, average sport effort in the Alaska Peninsula/Aleutian Island Regulatory Area from 1977 through 1995 has been 20,890 angler-days (Table 1).

The most popular fishery in the KMA in terms of recreational angling effort expended since 1986 has been the fresh and marine waters of the Kodiak Road System (Figure 2). Since 1986, these waters have accounted for just over half of the recreational angling effort expended in the KMA. The Buskin River is the most heavily fished stream both along the Kodiak Road System and in the Kodiak Regulatory Area, averaging over 19,000 angler-days of fishing effort annually (Table 2). Other major freshwater fisheries along the Kodiak Road System occur on the Pasagshak, Olds, and American rivers; the various road accessible lakes near Kodiak; and in the marine waters of Chiniak and Marmot bays (Table 2). Popular fisheries in the remote area include the fresh and marine waters of the Afognak/Shuyak islands group and freshwater fisheries in the Karluk and Ayakulik rivers.

In the Alaska Peninsula/Aleutian Island regulatory area the fresh and marine waters of Adak Island have represented the most popular fishery in terms of recreational angling effort expended since 1986 (Table 3). Adak Island waters have accounted for an average of approximately 12,930 angler-days of recreational fishing effort since 1986 (Table 3). The Adak Navy base is in the process of closing. The base closure will have the effect of reducing the fishing effort in the regulatory area by over 50%. The major fisheries now will include marine and freshwater fisheries around the town of Unalaska and Cold Bay. In 1995 these fisheries totaled 7,020 angler days.

RECREATIONAL FISH HARVEST

From 1977 through 1995, an average of 98,600 fish have been harvested (kept) by sport anglers fishing KMA waters (Table 4; Appendices A1-A13). As was the case with recreational angler effort, harvests from KMA waters generally increased from 1977 through 1982, after which harvests have remained relatively stable. However, the 1994 and 1995 harvests are the lowest on record since 1979 and may be the beginning of a trend for reduced harvest. About 45% of the historic sport harvest has been salmon, of which nearly half has been pink salmon (Table 4, Figure 3). The average sport fish harvest for Kodiak Regulatory Area waters is 75,200 fish from 1977 through 1995, or 77% of the average KMA sport harvest (Table 5). Dolly Varden, pink and coho salmon, and halibut have accounted for most of the sport harvest. From 1977 through 1995, these four species have accounted for an average of approximately 66% of the total sport harvest from Kodiak Regulatory Area waters (Table 5).

Waters of the Alaska Peninsula/Aleutian Islands Regulatory Area have accounted for an average of 22,580 sport harvested fish from 1977 through 1995, or about 23% of the average KMA sport harvest (Table 6). Dolly Varden and pink, coho, and sockeye salmon have accounted for most of the sport harvest. From 1977 through 1995, these four species have accounted for an average of about 72% of the total sport harvest from Alaska Peninsula/Aleutian Islands Regulatory Area waters (Table 6).

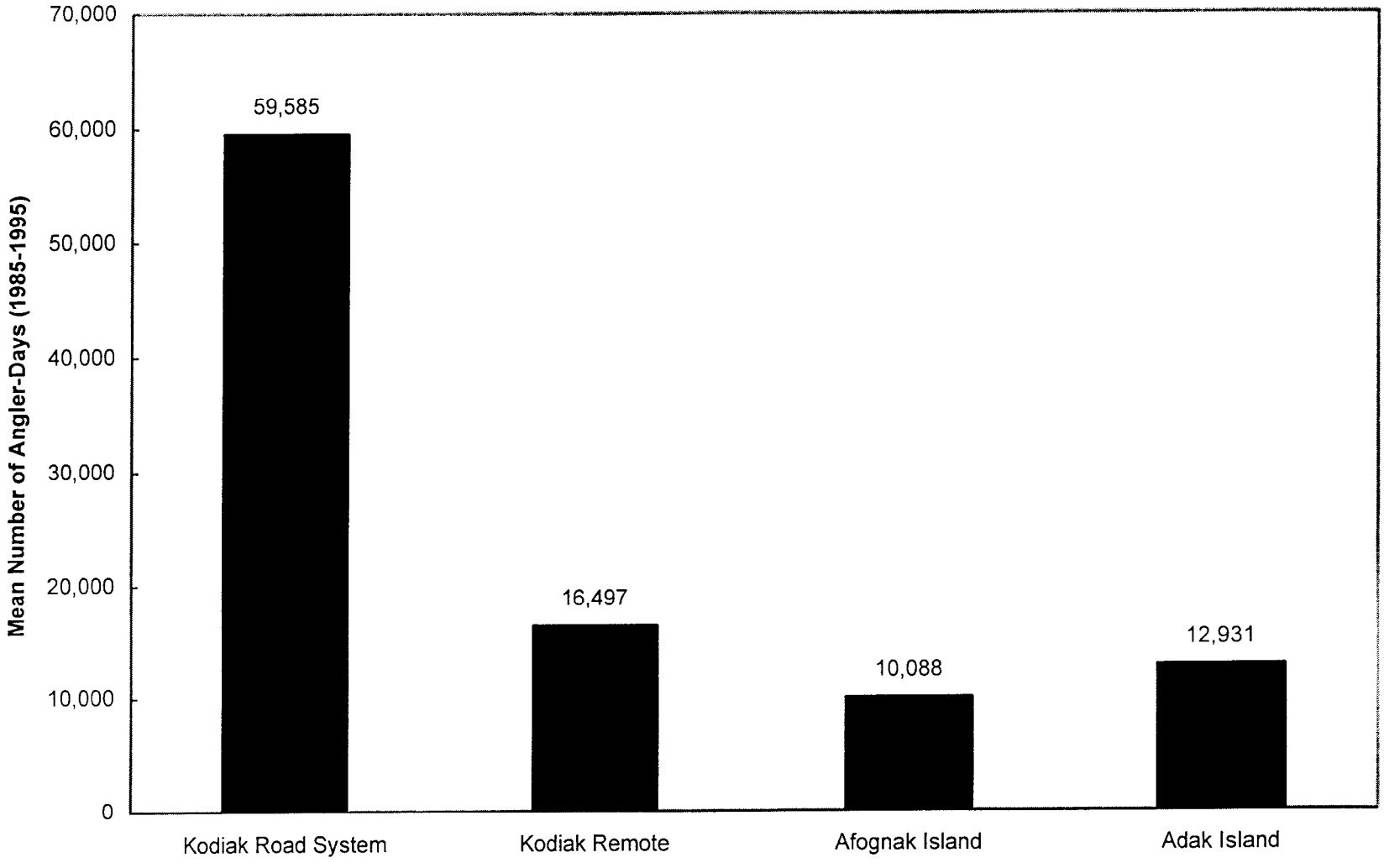

Figure 2.-Distribution of fishing effort expended by recreational anglers fishing KMA waters, 1985-1995, by area fished.

Table 2.-Number of angler-days of effort expended by sport anglers fishing Kodiak Regulatory Area waters, by location, 1982-1995.

Fishery	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Mean (86-95)
Kodiak Road System															
Buskin River & Mouth	20,404	18,354	24,108	34,109	24,506	16,481	18,457	26,347	19,560	21,991	15,482	17,072	16,534	14,089	19,052
Pasagshak River & Mouth	3,344	7,608	4,751	6,117	5,504	5,723	5,111	5,707	8,471	5,876	6,359	4,485	4,907	5,189	5,733
Olds River & Mouth		886	3,145	1,200	3,578	1,938	4,147	5,378	3,247	5,583	5,079	5,592	3,438	5,169	4,315
American River & Mouth		2,770	1,974	729	4,419	3,622	3,038	3,506	3,359	4,291	3,276	5,006	3,321	3,267	3,711
Roadside Lakes	2,474	2,918	2,492	1,562	582	1,390	1,677	969	1,666	1,541	2,261	1,186	1,277	1,203	1,375
Saltery														1,368	1,368
Other Fresh Waters		3,324	6,257	4,721	3,165	1,607	1,965	3,555	2,172	5,206	3,757	1,226	4,664	3,379	3,070
Marine Boat[a]				2,823	9,939	14,868	7,070	9,007	11,547	14,328	15,587	14,556	14,844	15,849	12,759
Marine Shore				4,403	7,321	10,110	9,146	9,559	7,115	11,122	7,507	7,234	7,957	4,950	8,202
Total	26,222	35,860	42,727	55,664	59,014	55,739	50,611	64,028	57,137	69,938	59,308	56,357	56,942	54,463	59,585
Kodiak Remote Area															
Karluk River System	3,514	2,216	1,339	3,158	1,070	3,919	2,530	2,609	3,393	4,547	5,430	6,894	10,948	6,928	4,827
Red River System		554	1,272	91	317	638	377	1,165	815	1,780	3,340	4,566	5,473	1,299	1,977
Other Fresh Waters	10,389	5,908	2,391	1,352	2,463	2,303	1,552	2,211	3,531	2,864	2,767	4,646	3,469	3,596	2,940
Marine Boat	21,086	24,042	22,268	11,157	2,168	3,164	2,052	1,738	2,126	4,183	3,332	7,095	9,193	4,584	3,964
Marine Shore	20,027	16,175	11,945	12,129	2,214	758	1,911	4,348	4,074	3,774	1,109	3,215	2,847	3,847	2,789
Total	55,016	48,895	39,215	27,887	8,232	10,782	8,422	12,071	13,939	17,148	15,978	26,416	31,930	20,254	16,497
Afognak/Shuyak/Barren Islands															
Fresh Water		1,699	718	774	29		109	213	718	487	541	885	789		377
Marine Boat				486	7,890	6,610	7,163	8,507	7,454	7,003	7,401	8,274	7,901	7,953	7,607
Marine Shore				30	2,001	2,519	3,020	1,523	2,355	2,258	1,549	1,388	1,570	2,859	2,104
Total	0	1,699	718	1,290	9,920	9,129	10,292	10,243	10,527	9,748	9,491	10,547	10,260	10,812	10,088
Regulatory Area Total	81,238	86,454	82,660	84,841	77,166	75,650	69,325	86,342	81,603	96,834	84,777	93,320	99,132	85,529	86,170

[a] The Kodiak Road Zone was established by the Board of Fisheries in 1985. Prior to 1985 all saltwater fishing effort is listed as Remote Area.

Table 3.-Number of angler-days of effort expended by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, by location, 1982-1995.

Fishery	1982	1983	1984	1985	1986	1987	1988	1989	1991	1992	1993	1994	1995	Mean (86-95)
Adak Island														
Marine	4,896	5,080	6,710	884	1,638	2,033	3,875	4,177	9,187	12,316	4,314	521	1,184	3,925
Fresh Water	4,026	5,445	3,323	5,531	11,694	12,417	11,642	9,569	15,242	14,963	2,735	524	824	7,961
Total	8,922	10,525	10,033	6,415	13,332	14.450	15,517	13,746	24,429	27,279	7,049	1,045	2,008	11,886
Unalaska Island														
Marine				816	1,808	1,569	129	541	1,461	3,215	736	3,642	2,947	1,780
Fresh Water				1,596	362	21	197	239	56	1,161	321	1,381	935	589
Total				2,412	2,170	1,590	326	780	1,517	4,376	1,057	5,023	3,882	2,369
Cold Bay														
Marine	1,211		212	35	452	1,895	1,376	1,080	870	801	429	2,169	1,404	1,174
Fresh Water	5,271		692	555	1,251	1,132	327	1,320	2,342	2,634	925	1,916	1,733	1,679
Total	6,482		904	590	1,703	3,027	1,703	2,400	3,212	3,435	1,354	4,085	3,137	2,853
Other														
Marine	2,968		3,506	1,418	2,581	1,948	3,104	5,442	4,539	6,121	9,265	4,341	3,524	4,619
Fresh Water	6,142		4,023	2,217	1,527	2,304	1,656	2,158	897	2,455	2,211	2,787	1,101	1,799
Total	9,110		7,529	3,635	4,108	4,252	4,760	7,600	5,436	8,576	11,476	7,128	4,625	6,418
Regulatory Area Total														
Marine	9,075		10,428	3,153	6,479	7,445	8,484	11,240	16,057	22,453	14,774	10,673	9,059	11,946
Fresh Water	15,439		8,038	9,899	14,834	15,874	13,822	13,286	18,537	21,213	6,192	6,608	4,593	12,498
Total	24,514		18,466	13,052	21,313	23,319	22,306	24,526	34,594	43,666	20,966	17,281	13,652	24,571

Table 4.-Number of fish harvested (kept) by sport anglers fishing Kodiak Management Area waters, 1977-1995.

	SALMON					MARINE			FRESH WATER FISHERIES								
YEAR	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	RAZOR CLAMS	HALI-BUT	ROCK-FISH	DOLLY VARDEN	ARCTIC GRAYLING	RAIN-BOW TROUT	LAND-LOCKED SALMON	STEEL-HEAD TROUT	SMELT	LING COD	OTHER FISH	TOTAL
1977	14,634	5,722	1,848	1,113	1,869	7,474	994	2,810	15,900	153	1,747	229	232	9,969		5,149	69,843
1978	18,374	6,033	2,241	583	1,619	3,208	1,721	1,907	16,9[illegible]	370	1,590	90	162	4,523		2,775	62,158
1979	19,698	12,496	4,134	1,176	591	8,363	3,013	3,599	33,311	209	1,345	373	318	2,515		2,227	93,368
1980	30,093	14,319	4,114	723	1,334	11,826	3,651	1,489	30,685	1,223	3,211	628	671	4,103		1,799	109,869
1981	20,650	11,696	4,698	1,264	1,166	3,452	7,711	6,663	31,482	648	1,653	379	313	3,024		6,641	101,440
1982	30,462	14,627	4,532	2,576	2,567	1,944	9,977	4,170	36,065	707	3,715	712	258	2,620		16,651	131,583
1983	12,870	9,678	4,438	1,295	963	2,000	8,809	3,314	30,192	136	4,348	954	302	0		2,077	81,376
1984	17,343	15,892	6,358	1,196	1,609	7,360	9,148	9,347	28,528	361	2,828	1,547	696	96		7,024	109,333
1985	15,426	15,032	8,225	1,133	915	4,970	7,839	4,890	22,562	870	3,119	889	790	25		2,206	88,891
1986	17,365	25,458	6,233	830	541	7,064	11,975	5,165	26,459	15	928	726	321	0		19,742	122,822
1987	13,532	19,402	4,562	1,002	792	2,155	11,465	8,547	15,831	594	1,849	1,116	253	462		10,519	92,081
1988	31,296	21,379	8,853	2,153	1,824	4,614	9,697	13,244	22,592	382	964	18	853	0		8,756	126,625
1989	29,176	23,700	13,173	2,226	941	1,477	11,847	5,325	18,635	726	1,861	1,587	788	0		1,996	113,458
1990	29,997	20,065	8,224	1,156	412	173	11,679	6,519	21,052	86	1,528	1,330	1,120	0		3,983	107,324
1991	20,789	21,327	7,137	2,752	1,676	119	17,309	9,259	21,418	155	1,586	3,982	613	0	2,345	4,552	115,019
1992	11,473	16,920	8,408	2,671	913	973	13,505	6,566	11,525	120	1,195	887	96	1,222	1,753	1,928	80,155
1993	15,570	22,889	10,526	5,738	896	1,286	17,660	8,358	10,233	50	483	3,087	332	67	1,120	2,564	100,859
1994	6,032	14,600	13,502	3,303	380	4,322	17,312	5,743	6,608	41	731	0	243	0	1,199	1,808	75,824
1995	13,185	15,194	9,333	2,859	1,144	0	16,785	4,806	9,263	0	321	67	94	0	1,007	1,771	75,829
MEAN	19,367	16,128	6,870	1,881	1,165	3,830	10,111	5,879	21,542	360	1,803	979	432	1,506	1,622	5,480	97,782[a]
PERCENT	20	16	7	2	1	4	10	6	22	0	2	1	0	2	2	6	100

[a] The mean total harvest of 97,782 does not equal the sum of the mean for each species because from 1977-1990 there is no lingcod added to the total fish count for the year but there is an average harvest for lingcod listed.

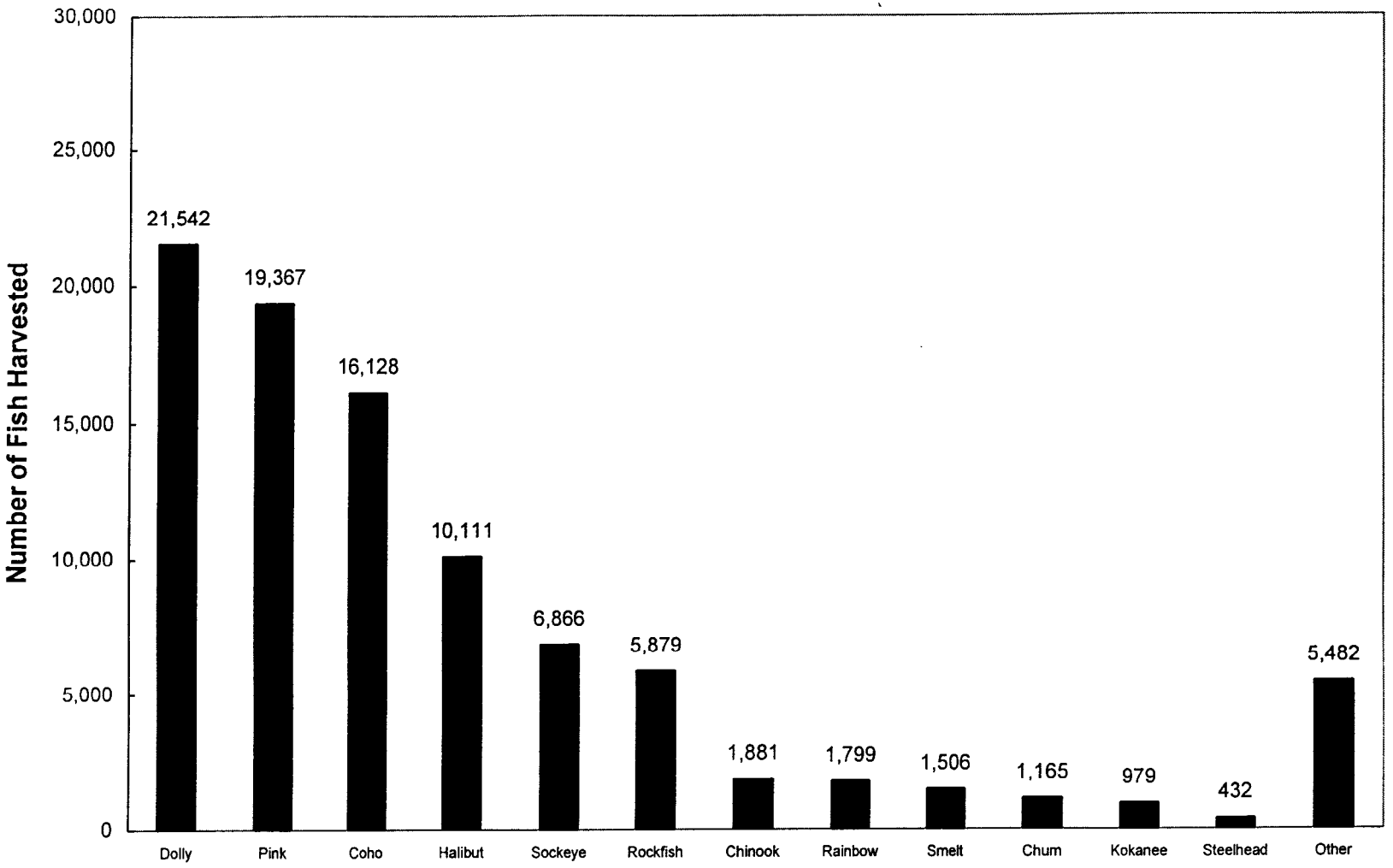

Figure 3.-Average composition of the historical harvests of fish by recreational anglers fishing KMA waters, 1977-1995.

Table 5.-Number of fish harvested (kept) by sport anglers fishing Kodiak Regulatory Area waters, 1977-1995.

YEAR	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	RAZOR CLAMS	HALI-BUT	ROCK FISH	LING COD	DOLLY VARDEN	ARCTIC GRAY-LING	RAIN-BOW TROUT	LAND-LOCKED SALMON	STEEL-HEAD TROUT	SMELT	OTHER FISH	TOTAL
1977	14,519	4,716	1,255	483	1,645	7,474	994	2,810		14,536	54	1,472	229	232	5,652	5,149	61,220
1978	17,739	4,927	1,776	350	1,287	3,208	1,721	1,907		15,805	325	994	90	162	0	2,775	53,066
1979	15,871	11,522	2,436	752	500	8,363	3,013	3,599		25,421	127	972	373	318	943	2,227	76,437
1980	18,969	12,692	2,178	327	525	11,826	3,651	1,489		20,663	465	2,523	628	671	2,092	1,799	80,498
1981	12,259	10,584	1,620	789	637	3,452	6,858	6,242		19,516	119	886	379	313	2,160	5,097	70,911
1982	18,850	13,329	3,055	1,120	1,324	1,944	9,180	3,992		23,771	225	3,380	712	258	2,620	14,188	97,948
1983	8,936	7,823	3,150	729	816	2,000	8,545	3,252		19,439	126	4,296	954	302	0	1,836	62,204
1984	12,779	14,612	5,385	921	1,321	7,360	8,179	8,231		23,092	286	2,592	1,547	696	0	2,181	89,182
1985	13,423	13,625	7,536	762	865	4,970	7,303	4,691		17,516	820	2,564	106	790	25	1,911	76,907
1986	14,509	20,873	5,259	520	336	7,064	10,960	4,479		20,657	15	841	0	321	0	10,922	96,756
1987	11,662	16,912	4,165	379	560	2,155	9,869	6,501		8,763	72	1,448	434	253	462	9,080	72,715
1988	19,044	18,809	6,222	1,564	1,546	4,614	7,749	11,369		18,663	182	855	0	853	0	8,694	100,164
1989	17,794	19,802	6,789	1,087	631	1,477	10,435	5,070		14,266	189	1,534	60	788	0	1,757	81,679
1990	7,464	13,728	6,056	996	191	173	9,134	3,842		14,235	86	1,484	52	1,120	0	2,657	61,218
1991	12,106	17,691	5,049	2,508	1,517	119	12,110	8,215	1,352	13,082	98	1,296	0	613	0	2,995	78,751
1992	5,904	13,668	6,240	2,217	625	973	10,860	5,652	1,454	7,389	120	1,179	151	96	140	1,062	57,730
1993	12,324	21,241	7,849	5,092	504	1,286	14,169	7,569	922	6,299	16	374	0	332	67	1,618	79,662
1994	5,336	12,406	12,502	3,166	290	4,322	14,910	5,019	1,014	5,981	41	731	0	243	0	1,578	67,539
1995	11,926	13,236	7,994	2,622	981	0	13,989	4,247	932	6,469	0	283	0	94	0	1,467	64,240
MEAN	13,231	13,800	5,080	1,389	847	3,831	8,612	5,167	1,135	15,555	177	1,563	301	445	745	4,157	75,201
PERCENT	17	18	7	2	1	5	11	7	1	20	0	2	1	1	2	5	100

[a] The mean total harvest of 75,201 does not equal the sum of the mean for each species because from 1977-1990 there is no lingcod added to the total fish count for the year but there is an average harvest for lingcod listed.

Table 6.-Number of fish harvested by sport anglers fishing Alaska Peninsula/Aleutian Islands Regulatory Area waters, 1977-1995.

YEAR	PINK	COHO	SOCK-EYE	CHINOOK	CHUM	HALIBUT	ROCK FISH	LING COD	DOLLY VARDEN	ARCTIC GRAYLING	RAINBOW TROUT	LANDLOCKED SALMON	SMELT	OTHER FISH	TOTAL
1977	115	1,006	593	630	224	0	0		1,364	99	275	0	4,317	0	8,623
1978	635	1,106	465	233	332	0	0		1,157	45	596	0	4,523	0	9,092
1979	3,827	974	1,698	424	91	0	0		7,890	82	373	0	1,572	0	16,931
1980	11,124	1,627	1,936	396	809	0	0		10,022	758	688	0	2,011	0	29,371
1981	8,391	1,112	3,078	475	529	853	421		11,966	529	767	0	864	1,544	30,529
1982	11,612	1,298	1,477	1,456	1,243	797	178		12,294	482	335	0	0	2,463	33,635
1983	3,934	1,855	1,288	566	147	264	62		10,753	10	52	0	0	241	19,172
1984	4,564	1,280	973	275	288	969	1,116		5,436	75	236	0	96	4,843	20,151
1985	2,003	1,407	689	371	50	536	199		5,046	50	555	783	0	295	11,984
1986	2,856	4,585	974	310	205	1,015	686		5,802	0	87	726	0	8,820	26,066
1987	1,870	2,490	397	623	232	1,596	2,046		7,068	522	401	682	0	1,439	19,366
1988	12,252	2,570	2,631	589	278	1,948	1,875		3,929	200	109	18	0	62	26,461
1989	11,382	3,898	6,384	1,139	310	1,412	255		4,369	537	327	1,527	0	239	31,779
1990	22,533	6,337	2,168	160	221	2,545	2,677		6,817	0	44	1,278	0	1,326	46,106
1991	8,683	3,636	2,088	244	159	5,199	1,044	993	8,336	57	290	3,982	0	1,557	36,268
1992	5,569	3,252	2,168	454	288	2,645	914	299	4,136	0	16	736	1,082	866	22,425
1993	3,246	1,648	2,677	646	392	3,491	789	198	3,934	34	109	3,087	0	946	21,197
1994	696	2,194	1,000	137	90	2,402	724	185	627	0	0	0	0	230	8,285
1995	1,259	1,958	1,339	237	163	2,796	559	75	2,794	0	38	67	0	304	11,589
MEAN	6,134	2,327	1,791	493	318	1,499	712	401	5,986	183	278	679	761	1,325	22,581
PERCENT	27	10	8	2	1	7	3	2	27	1	1	3	3	6	100

[a] The mean total harvest of 22,581 does not equal the sum of the mean for each species because from 1977-1990 there is no lingcod added to the total fish count for the year but there is an average harvest for lingcod listed.

During 1995, 75,830 fish were harvested by sport anglers fishing KMA waters (Table 4). This harvest was very similar to the 1994 harvest of 75,790 and the lowest on record since 1978. The 1995 harvest represented 2.3% and 2.8% of the total statewide and southcentral region sport harvests, respectively, during 1995 (Howe et al. 1996). The largest fisheries in terms of fish harvested during 1995 were for halibut, coho and pink salmon. These species accounted for 22%, 20%, and 17%, respectively, of the total 1995 KMA sport harvest.

RECREATIONAL FISH CATCH AND RELEASE

Estimates of the number of fish caught and released by sport anglers fishing KMA waters became available for the first time during 1990 (Mills 1991). Estimates, computed for 1995 using the statewide harvest survey (Howe et al. 1996), show that of the 204,220 fish caught by sport anglers fishing KMA waters, 63% (or 128,390 fish) were released (Table 7, Appendices J1-J4). Considerable variability exists in the percent of fish released depending on the species and regulatory area fished (Figure 4). For example, only 45% of the coho caught by sport anglers were released, whereas 94% of the steelhead caught were released (Table 7).

COMMERCIAL AND SUBSISTENCE SALMON HARVESTS

Salmon returning to KMA streams are also harvested by various commercial fisheries. In all cases, harvests in the commercial fisheries (Appendices B and C) are much larger than associated sport fisheries. Fish stocks of the KMA are also harvested in various subsistence fisheries.

ECONOMIC VALUE OF SPORT FISHERIES

There are no direct estimates available to assess the economic value of the recreational fisheries of the KMA. The Jones and Stokes Associates, Inc. (1987) survey of southcentral sport fisheries did not specifically address the sport fisheries of the KMA. A rough approximation of the economic value of the sport fisheries of the KMA can be made, however, by applying the direct expenditures per angler-day values for southcentral Alaska resident and nonresident sport anglers through the Jones and Stokes survey to the estimated sport effort of the KMA (Table 8). Based on this method, the economic value of the sport fisheries of the KMA during 1986 was approximately 12 million dollars. This compares to an estimated value of 127 million dollars for southcentral Alaska sport fisheries during 1986 (Jones and Stokes Associates, Inc. 1987).

STOCKING PROGRAM INVENTORY

Stocking has been used to increase and diversify the opportunities available to sport anglers fishing KMA waters. Various species and life stages have historically been stocked including anadromous chinook smolt and coho salmon fingerlings along with landlocked coho and rainbow trout fingerlings. Nearly all of the stocking has taken place within waters of the Kodiak Road System; however, some stocking has occurred in several remote waters of the KMA (Chignik, Port Lions, Ouzinkie).

During 1996, approximately 214,000 hatchery-reared fish were stocked into KMA road system waters in order to provide angling opportunities (Table 9). Most of the stockings on the road system were comprised of anadromous chinook salmon smolt (103,800) (Figure 5). Rainbow trout (66,900) and anadromous coho fingerlings (43,250) were also stocked. Anadromous coho fingerlings (163,200) were also stocked off the road system by the Kodiak Regional Aquaculture Association primarily to provide fish for commercial fisheries.

Table 7.-Number of fish, by species, harvested and released by sport anglers fishing Kodiak Management Area waters during 1995.

Species	Kodiak Regulatory Area				Alaska Peninsula/Aleutian Islands Regulatory Area				Kodiak Management Area Total			
	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.	Harvest	Release	Total	% Rel.
Pink Salmon	11,926	33,317	45,243	74	1,259	2,733	3,992	68	13,185	36,050	49,235	73
Coho Salmon	13,236	8,086	21,322	38	1,958	4,171	6,129	68	15,194	12,257	27,451	45
Sockeye Salmon	7,994	8,956	16,950	53	1,339	937	2,276	41	9,333	9,893	19,226	51
Chinook Salmon	2,622	4,617	7,234	64	237	366	603	61	2,859	4,983	7,842	64
Chum Salmon	981	2,022	3,003	67	163	650	813	80	1,144	2,672	3,816	75
Dolly Varden	6,469	20,085	26,554	76	2,794	7,762	10,556	74	9,263	27,847	37,110	75
Other	1,467	5,940	1,407	80	304	1,368	1,672	82	1,771	7,308	9,079	80
Rainbow Trout	283	2,165	2,448	88	38	904	942	96	321	3,069	3,390	91
Steelhead Trout	94	1,558	1,652	94	0	0	0	0	94	1,558	1,652	94
Landlocked Salmon	0	0	0	0	67	25	92	27	67	25	92	27
Arctic Grayling	0	9	9	100	0	0	0	0	0	9	9	100
Halibut	13,989	13,609	27,598	49	2,796	2,932	5,728	51	16,785	16,541	33,326	50
Rockfish	4,247	4,112	8,359	49	559	932	1,491	63	4,806	5,044	9,850	51
Lingcod	932	626	1,558	40	75	512	587	87	1,007	1,138	2,145	53
Smelt	0	0	0	0	0	0	0	0	0	0	0	0
Clams	0	0	0	0	0	0	0	0	0	0	0	0
Total	64,240	105,102	169,342	62	11,589	23,292	34,881	67	75,829	128,394	204,223	63

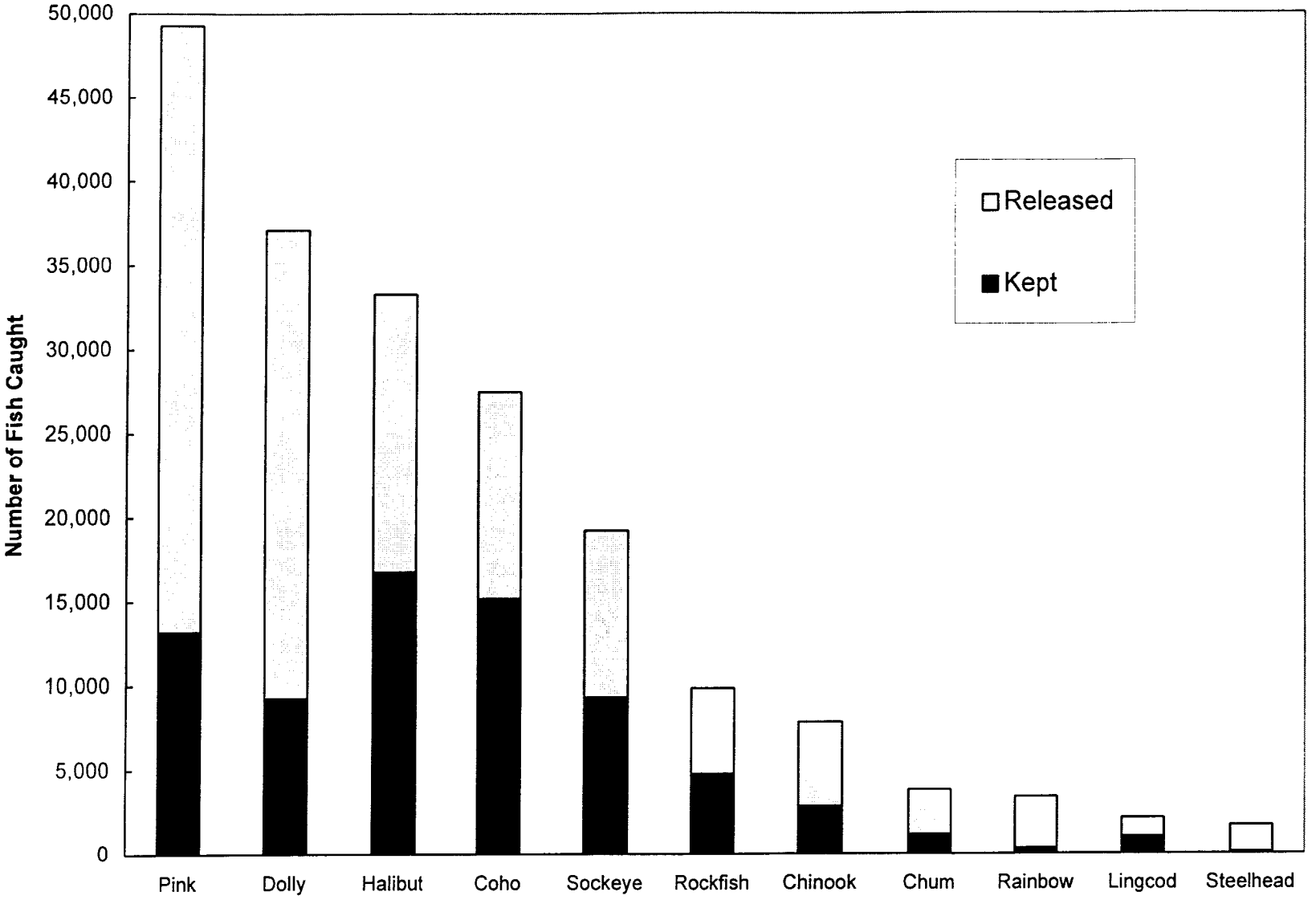

Figure 4.-Number of fish kept and released, by species, by recreational anglers fishing KMA waters during 1995.

Table 8.-Estimated economic value of KMA sport fisheries during 1986.

Angler Type	SOUTHCENTRAL ALASKA			KODIAK MANAGEMENT AREA		
	Angler-Days[a]	Expenditures[b]	$/Ang-Day	Angler-Days[a]	$/Ang-Day[c]	Expenditures
Resident	1,153,660	$ 74,163,000	$ 64.29	68,936	$ 64.29	$ 4,431,549
Non-Resident	201,488	$ 52,892,000	$262.51	29,473	$262.51	$ 7,736,867
BOTH	1,355,148	$127,055,000	---[d]	98,479	---[d]	$12,168,416

[a] From Mills 1987.

[b] From Jones and Stokes Associates, Inc. 1987.

[c] Computed from southcentral Alaska sport fisheries.

[d] Not computed.

Table 9.-Releases of hatchery-reared fish into KMA waters, 1989-1996.

Species/ Size		Actual							
		1989	1990	1991	1992	1993	1994	1995	1996
R. Trout	Horseshoe L.	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Fingerling	Jack L.	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Aurel L.	3,000	3,000	3,000	3,000	3,000	3,000	3,000	2,800
	Big L.	3,600	3,600	3,600	1,800	3,600	7,950	4,000	7,000
	Tanignak L.	3,700	6,000	6,000	0	6,000	6,000	6,000	6,000
	Bull L.	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,400
	Cascade L.	3,300	3,300	3,300	800	3,300	0	3,300	3,300
	Lee L.	2,800	2,800	2,800	2,800	2,800	2,800	2,800	3.000
	Twin L.	4,000	4,000	4,000	4,000	4,000	4,000	4,000	5,000
	Lilly L.	1,600	1,600	900	800	1,600	5,100	1,730	2,000
	Heitman L.	3,200	3,200	3,300	800	3,250	0	3,250	3,250
	Long L.	3,600	3,600	3,600	900	0	3,600	3,600	3,600
	Caroline L.	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400
	Lupine L.	1,600	1,000	1,600	1,600	1,600	1,600	1,600	2,000
	Dragon Fly L.	1,500	1,500	1,500	1,600	1,550	1,500	1,550	1,550
	Cicely L.	1,200	1,200	1,200	1,200	1,150	1,150	1,150	1,400
	Abercrombie	3,700	3,700	3,700	3,200	3,700	8,350	6,300	4,000
	Margaret L.	1,600	1,600	1,700	800	1,600	6,850	1,730	2,000
	Jupiter L.	3,600	3,600	3,600	900	3,600	0	3,600	3,600
	Saturn L.	2,400	2,400	2,400	600	2,400	0	2,400	2,400
	Dolgoi L.	0	5,200	5,200	1,300	5,150	5,150	5,150	3,200
	Chignik L.	0	2,000	5,000	5,000	0	5,000	5,000	5,000
	Rainbow Total	49,800	58,700	61,800	31,500	53,700	62,450	65,560	66,900
Chinook	Island L.	114,400	110,000	56,000	94,700	66,950	90,700	0	0
Smolt	Mission L.	0	0	31,000	0	0	0	0	0
	Buskin River	0	0	0	0	0	0	83,758 [a]	103,800
	Chinook Total	114,400	100,000	87,000	94,700	66,950	90,700	83,758	103,800
Arctic	Aurel L.	20,000	14,200	20,000	20,000	20,000	20,000	0	0
Grayling	Cascade L.	10,000	10,000	10,000	10,000	10,000	10,000	0	0
Fry	Cicely L.	10,000	8,200	10,000	10,000	10,000	10,000	0	0
	Heitman L.	30,000	30,000	30,000	30,000	30,000	30,000	0	0
	Grayling Total	70,000	62,400	70,000	70,000	70,000	70,000	0 [b]	0

-continued-

Table 9.-Page 2 of 2.

Species/ Size		Actual							
		1989	1990	1991	1992	1993	1994	1995	1996
	Anadromous								
Coho	Mayflower L.	6,900	2,500	6,500	3,250	16,000	16,400	3,809	0
Fingerling	Island L.	22,500	8,500	22,500	22,500	16,000	47,400	23,523	14,000
	Dark L.	7,500	7,500	7,500	7,500	8,000	18,000	12,571	0
	Mission L.	10,000	10,000	12,700	7,500	8,000	30,200	20,285	14,000
	Orbin L.	7,500	7,500	5,100	3,750	8,000	0	0	0
	Kalsin L.	19,500	0	19,340	8,200	8,000	0	0	0
	Potatoe Patch L.	7,500	0	9,500	7,500	0	20,000	4,857	0
	Ouzinkie L.	20,000	0	0	15,000	15,052 [d]	0	16,000	15,246
	[c] Crescent L.	203,000	0	191,400	69,000	60,000 [d]	163,680	167,000	163,200
	[c] Little Kitoi L.	33,500	0	0	0	139,147	0	87,000	0
	[c] Hidden L.	239,800	0	250,900	0	0	0	0	0
	[c] Jenifer L.	0	0	0	162,000	135,486	0	165,000	0
	[c] Ruth	0	0	0	0	0	0	59,000	0
	Subtotal remote	476,300	0	442,300	306,200	334,633	163,680	478,000	63,200
	Subtotal road	101,400	36,000	83,200	60,200	69,052	132,000	81,045	43,246
	Subtotal both	577,700	36,000	525,500	366,400	403,685	295,680	559,045	206,446
	Landlocked								
Coho	Pony L.	2,600	0	2,400	0	0	4,200	3,238	0
Fingerling	Southern L.	2,400	0	0	0	0	0	2,857	0
	Total	5,000	0	2,400	0	0	4,200	6,095	0
All Species	GRAND TOTAL	809,300	264,700	746,700	562,600	594,335	523,030	714,458	377,146

[a] These fish were from Willow Creek brood stock, 39,161 of which were coded wire tagged. Prior to 1995 the brood stock was from Crooked Creek, and smolt were not tagged.

[b] Project terminated in 1995 because stocking did not generate a fishery.

[c] Remote location outside of the Kodiak Road System.

[d] Presmolt.

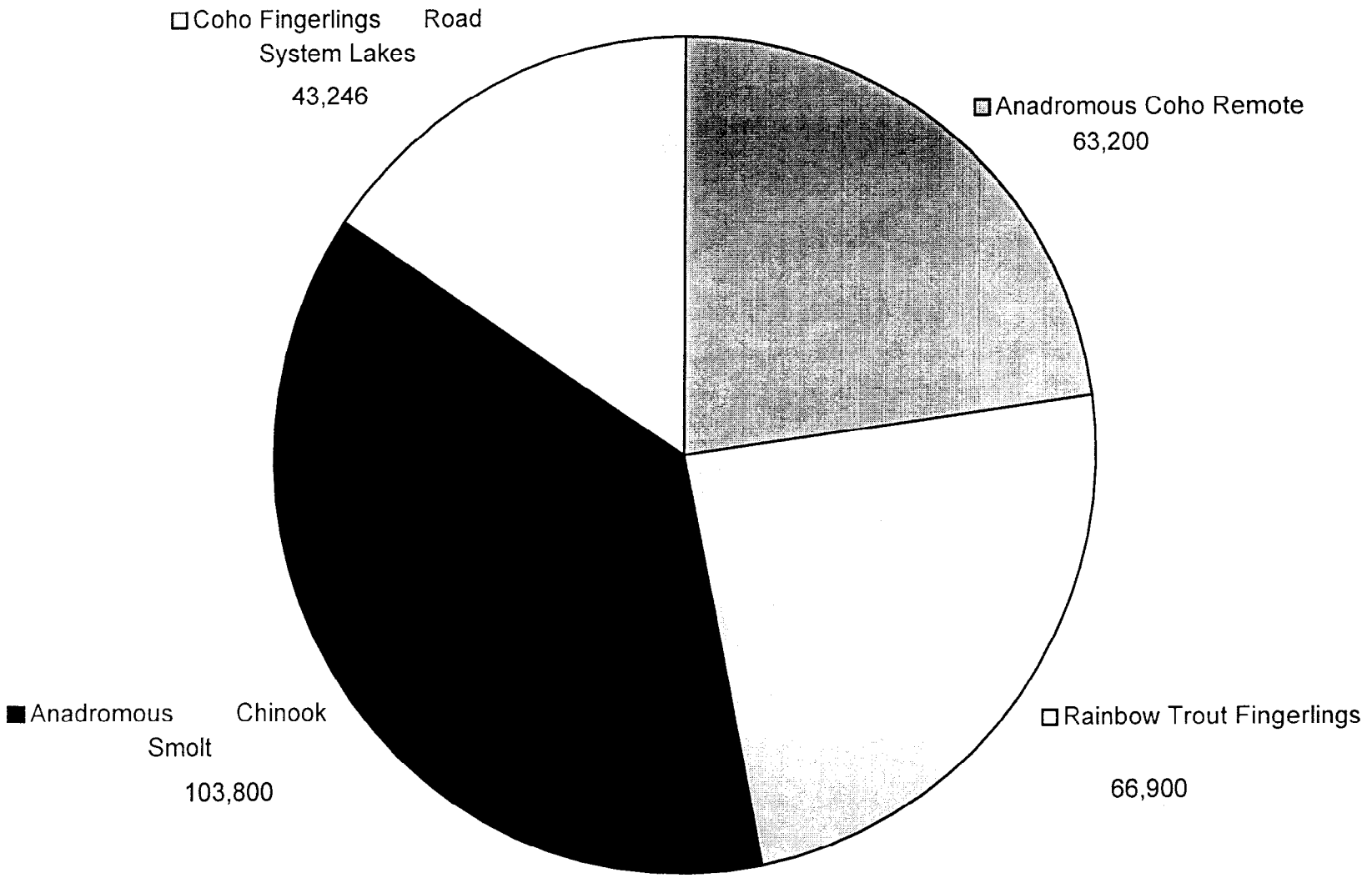

Figure 5.-Stockings of hatchery-reared fish into KMA waters during 1995.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are four major research activities ongoing in the KMA. The first involves continued operation of the Buskin River weir to determine the numbers and age, sex, and length compositions of the coho and sockeye salmon immigrations to the Buskin River. The second research program, initiated in 1991, is stock assessment of steelhead trout to the Karluk River. Historically, this resource has supported one of the largest steelhead trout returns in Alaska. Kelt emigration data from the late 1980s, however, indicated that this stock was depressed. Current objectives of the research program are to obtain estimates of population size and the number of steelhead trout harvested in the commercial, subsistence and sport fisheries.

A third research program, initiated in 1992, involves the dockside sampling of recreationally harvested marine groundfish at the Kodiak boat harbor. This program has the objective of defining the species, age, sex, and size compositions of recreational groundfish harvests returning to the Kodiak boat harbor. The long-term goal of this project is to determine important life history characteristics of these species necessary to assess the long-term health and sustained yields of these stocks. During the 1994 season an additional element was added to this project. Chinook salmon harvested by saltwater anglers were checked for adipose finclips. The ratio of clipped fish to unclipped fish was documented. Heads from fish that had finclips were sent to Juneau so that the coded wire tag could be recovered and stream of origin determined.

A fourth research program, initiated in June 1993, deals with the chinook salmon populations in the KMA, primarily the Karluk, Ayakulik and Chignik rivers. Age, sex and size data were collected from the Karluk and Ayakulik rivers escapement. Rafters were also censused at the weir for chinook catch and effort data. In Chignik, the commercial chinook purse seine catch from Chignik Lagoon was sampled for age, sex and size data. These data are assumed to be similar to that of the escapement.

There are several routine management activities that are ongoing in the KMA. These activities include:

1. Participation in the Alaska Board of Fisheries process,
2. Fishery monitoring and inseason fishery management (a list of emergency orders issued for KMA fisheries from 1989 through 1996 is presented in Appendix H),
3. Involvement with the public,
4. Habitat monitoring and permit review, and
5. Annual fish stockings.

ACCESS PROGRAMS

The Federal Aid program stipulates that a portion of the federal funds passed on to states be used to increase opportunities for angler access to sport fisheries.

As various native corporations and private landowners begin to develop their land use plans on Kodiak Island, the need to ensure public access has become more critical. As a result, a list of prioritized objectives was developed and is presented below:

1. Extension of the Anton Larsen Bay boat launch ramp,
2. Parking lot improvement adjacent to the Anton Larsen Bay boat ramp,
3. Secure access along the Olds and American rivers,
4. Secure access along the Karluk River,
5. Secure access along the Ayakulik River,
6. Secure access in Afognak Lagoon,
7. Secure access in the Anton Larsen River,
8. Determine the land status of stocked lakes along the Kodiak Road System and pursue securing access.

A synopsis of each access project is presented in Appendix I.

During the fall of 1994 construction of the parking lots along the Russian, Olds, American and Buskin rivers was initiated and completed in 1995. An extension of the Anton Larsen Bay boat launch ramp was also completed in 1995.

MANAGEMENT AREA FISHERY OBJECTIVES

The Division of Sport Fish recommended several priority criteria to guide the establishment of fishery objectives (internal memo from Norval Netsch, Sport Fish Director to Carl Rosier, Fish and Game Commissioner, dated 3/27/91). These include:

1. **Management and protection of existing fish resources**. This criterion directs that divisional activities should strive to manage and protect Alaska's wild stocks of fish resources for future generations.
2. **Public use and benefits of existing fish resources**. This criterion directs that divisional activities should strive towards making Alaska's fishery resources available for public use and benefit on a sustained yield basis.
3. **Rehabilitation of depressed stocks and damaged habitat**. This criterion directs that divisional activities should strive to restore and maintain fish habitat damaged by man's activities.
4. **Enhancement of natural production or creation of new opportunities**. This criterion directs that the division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively affect other fisheries.

To date, no specific fishery objectives have been developed for KMA sport fisheries. Anglers are beginning to request that specific rivers and fisheries (Kodiak Island freshwater chinook, Alaska Peninsula and Kodiak steelhead, and road system rivers) be managed for various objectives (catch and release or fly fishing only). Participation of the public in the development of these objectives is desired and will be solicited.

Although no specific fishery objectives have been established to date, an assumption of past and current fisheries management has been to assure for the sustained yield of the various fishery

stocks that occur within the KMA while assuring for continued and, where possible, expanded opportunity to participate in fisheries targeting these stocks.

MAJOR BIOLOGICAL AND SOCIAL ISSUES FOR THE KMA

Compared to other management areas in Region II, there are relatively few major biological or social issues surrounding the KMA sport fisheries. The few major issues that do exist are as follows:

1. Karluk River Steelhead Trout. Historically, the Karluk River has supported one of the largest steelhead trout returns in Alaska. Kelt emigration data during the late 1980s, however, indicated that this stock was depressed. A research project, described in the section on steelhead trout, was initiated in 1992 to assess this resource. Initial results are that the population has recovered, and the 1995 spawning population was at record levels.
2. Karluk and Ayakulik Rivers Chinook Salmon (access). In recent years, there has been a marked increase in participation in the Karluk and Ayakulik rivers' chinook salmon fisheries. Increase in participation has occurred in spite of a lack of access facilities for recreational anglers. The department is currently investigating land purchase alternatives and easement clarification and resolution to address this issue.
3. Kodiak Road System Salmon Escapements. The Kodiak Road System is the most heavily fished area on the entire island, accounting for over half of the angler days in the Kodiak Management area. There are several small coho salmon stocks located along the road system which are susceptible to overharvest due to their small size (Salonie Creek, American River, Olds River and Roslyn Creek). Coho escapement into these streams should be monitored to ensure these small stocks are not overharvested and, as a result, do not decline in abundance.
4. Stocking Program. Although over 70,000 rainbow trout and nonanadromous salmon have been stocked into KMA waters in recent years, effort and harvest of the stocked fish has remained low. Greater education of the fishing public is recommended to increase utilization of these stocked fish.

SECTION II: MAJOR FISHERIES OVERVIEW

Section II provides a more detailed summary of all major fisheries that occur in the Kodiak Management Area. Included in this section are a description and historical perspective of each fishery, the objective governing the management of each fishery, description of the recent performance of each fishery, a description of recent Board of Fisheries actions with respect to each fishery, a description of any social or biological issues surrounding each fishery, and a description of any ongoing or recommended research or management activities directed at each fishery. The inseason management approach and/or outlook are presented if applicable. The major fisheries of the Kodiak Management Area which will be discussed are:

Kodiak Road System Fisheries
Dolly Varden Fishery
Pink Salmon Fishery
Coho Salmon Fishery
Sockeye Salmon Fishery
Landlocked Lakes Stocked Fisheries

Afognak/Shuyak Islands Fisheries
Coho Salmon Fisheries

Karluk and Ayakulik (Red) Rivers Fisheries
Steelhead Trout Fisheries
Chinook Salmon Fisheries
Sockeye Salmon Fishery

North Kodiak Island Archipelago Marine Fisheries

Developing Fisheries
Mill Bay Chinook Salmon Fishery
Chiniak Bay Chinook Salmon Fishery

Other Fisheries

KODIAK ROAD SYSTEM FISHERIES

The Kodiak Road System includes all fresh waters on Kodiak Island east of a line extending southward from Craig Point on the west side of Anton Larsen Bay to the westernmost point of Saltery Cove, and all saltwater bays and all salt waters within 1 mile of all points of land within the freshwater area described above, including Spruce, Woody and Long islands (Figure 6). All fisheries in this area can be accessed by road or small boat launched from the City of Kodiak.

The waters of the Kodiak Road System support the most popular fisheries in the KMA in terms of recreational angling effort expended since 1985. Since 1985, these waters have accounted for just over half of the recreational angling effort expended in the KMA. The Buskin River is the most heavily fished stream both along the Kodiak Road System and in the Kodiak Regulatory Area, averaging approximately 19,000 angler-days of fishing effort annually (Table 2).

There are five major freshwater fisheries that occur in the waters of the Kodiak Road System. These fisheries target Dolly Varden, coho salmon, pink salmon, sockeye salmon, and stocked fish in landlocked lakes. Saltwater fisheries along the road system target salmon, halibut and rockfish.

KODIAK ROAD SYSTEM DOLLY VARDEN FISHERY

FISHERY DESCRIPTION AND HISTORICAL PERSPECTIVE

Dolly Varden are available to anglers throughout the year along the Kodiak Road System, however, peak fishing opportunities typically occur as the fish migrate to and from overwintering (Buskin, Saltery and Pasagshak lakes) and spawning areas (Buskin, American, Olds, and Pasagshak rivers). Peak harvest typically occurs in May and mid-July through September. Spawning begins in September and continues into November.

All streams along the Kodiak Road System are open continuously to fishing for Dolly Varden, with the exception of an area on the Buskin River extending 300 feet downstream and 300 feet upstream of the Buskin River weir which is closed to fishing when the weir is in operation. The daily bag and possession limit is 10 Dolly Varden with no size limit.

From 1986 through 1995, the waters of the Kodiak Road System have accounted for an average harvest of 8,390 Dolly Varden (Table 10). This harvest has represented an average of about one-half of the total KMA Dolly Varden harvest during this period. Major sport fisheries for Dolly Varden in the Kodiak Road System include Buskin, Pasagshak, American, and Olds rivers. Since 1986, these four river systems have accounted for an average of over 67% of the total road system Dolly Varden harvest (Tables 10 and 11). Of these systems, the Buskin River has supported the largest fishery for Dolly Varden. Since 1977, the average harvest of Dolly Varden from the Buskin River has been 6,978 fish (Table 11), making this river the largest in terms of numbers of Dolly Varden harvested in the KMA and one of the largest fisheries for Dolly Varden in Alaska.

A research project to assess the structure and status of the Buskin River Dolly Varden stocks was initiated during the early 1980s. As part of this work, fishery and migration statistics have been estimated (Table 12). From 1984 through 1990, creel surveys documented that anglers fishing the Buskin River during the spring Dolly Varden emigration expended an average of 4,390

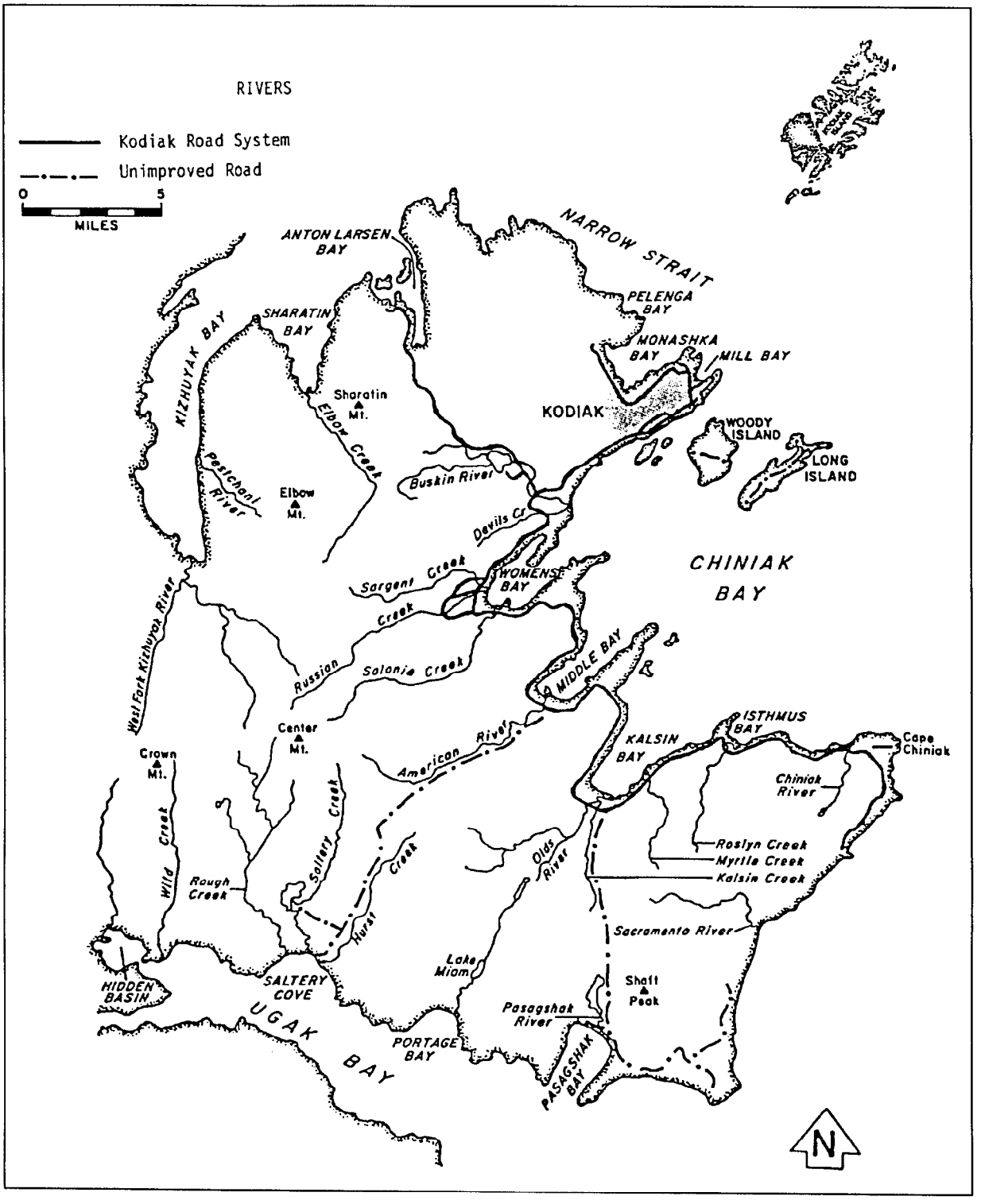

Figure 6.-Geographic boundaries of the Kodiak Road System Zone.

Table 10.-Harvest and release of Dolly Varden from Kodiak Road System waters of the Kodiak Management Area, 1986-1995.

		Kodiak Road System		
Year	KMA Harvest	Harvest	Release	% of KMA Harvest
1986	26,459	16,391		62
1987	15,831	7,859		50
1988	22,592	12,482		55
1989	18,635	10,470		56
1990	21,052	9,558	19,853	45
1991	21,418	9,718	9,447	46
1992	11,951	4,572	19,498	39
1993	10,233	3,955	22,577	39
1994	6,608	4,130	13,956	63
1995	9,263	4,723	11,078	51
MEAN	18,486	8,386	16,068	50

Note: Through 1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 11.-Harvest of Dolly Varden from selected Kodiak Road System streams, 1977-1995.

	Buskin River		Pasagshak River		American River		Olds River		Total	
Year	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	10,353		617						10,970	
1978	8,003		443						8,446	
1979	15,150		982						16,132	
1980	9,159		475						9,634	
1981	9,376		1,162						10,538	
1982	10,167		692						10,859	
1983	8,454		1,332		126		10		9,922	
1984	9,477		1,072		848		249		11,646	
1985	10,261		152		46		91		10,550	
1986	10,367		933		107		321		11,728	
1987	4,238		688		417		290		5,633	
1988	5,293		1,055		800		200		7,348	
1989	7,092		618		448		259		8,417	
1990	4,209	11,471	138	2,363	845	1,380	293	1,087	5,485	21,786
1991	4,337	7,623	1,124	1,398	375	245	288	260	6,124	9,526
1992	2,319	8,258	352	1,106	360	3,605	360	893	3,391	13,862
1993	1,150	4,346	194	1,316	115	6,261	468	1,919	1,927	13,842
1994	1,208	3,481	205	726	671	5,144	358	1,142	2,442	10,493
1995	1,969	5,767	294	414	631	1,111	392	567	3,286	7,859
MEAN	6,978	6,824	616	1,201	445	2,958	275	978	8,163	12,895
MEAN (86-95)	4,218		560		478		322		5,578	

Table 12.-Fishery and migration statistics for the Buskin River Dolly Varden resource, 1981-1993.

		FISHERY STATISTICS April 15-Jun 15[a]			FISHERY STATISTICS Entire Year[b]		MIGRATION STATISTICS (Weir Counts)	
Year	Reference	Effort (Ang-Days)	Harvest	Catch & Release	Harvest	Catch & Release	Emigration	Immigration [c]
1981	Murray 1982		8,437		9,376			
1982					10,167			
1983	Murray 1984		6,668		8,454			
1984	Murray 1985	3,410	5,460		9,477			
1985	Murray 1986		8,712		10,261		21,797	20,545
1986	Murray 1987	4,284	4,065		10,367		40,773	24,110
1987	Murray 1988a	4,619	4,766		4,238		29,919	32,848
1988	Murray 1989	4,523	3,569	5,067	5,293		31,260	34,306
1989	Murray 1990	5,204	5,761	5,567	7,092		35,605	30,851
1990	Whalen 1991	4,268	2,362	3,993	4,830	11,471	91,107 [d]	6,416 [e]
1991					4,337	7,623	30,725 [d]	NO DATA [f]
1992					2,319	8,258	74,451 [d]	NO DATA [f]
1993					1,150	5,496	NO DATA [f]	NO DATA [f]
Mean		4,385	5,533	4,876	7,626	9,117	44,428	24,846

[a] Data from creel survey conducted during the emigration period only.

[b] Information from Statewide Harvest Survey.

[c] Immigration counts stop when weir operation stops on approximately October 1. Fish continue to migrate through October and November, so the counts listed here are partial counts of the total immigration.

[d] Vexar mesh was placed over the weir in these years insuring fish over 210 mm total length could not pass through the weir pickets uncounted. In previous years, fish under 300 mm total length could pass through the weir uncounted.

[e] Partial count due to weir washout, not included in mean.

[f] The weir was not operated during the peak immigration period. Data not included in the mean.

angler-days of effort to harvest 5,530 Dolly Varden. From 1988 through 1990, these surveys also collected information on released fish and documented that anglers fishing during the spring emigration have also caught and released an average of 4,880 Dolly Varden.

RECENT FISHERY PERFORMANCE

The sport harvest of Dolly Varden from Kodiak Road System waters during 1995 was 4,720 fish, 44% below the historical mean harvest for the area (Table 10). Although the harvest was the fourth lowest on record and almost 4,000 fish below the average, catch figures remained high at over 15,800 fish. Anglers chose to release 70% of the fish they caught (Table 10). The Buskin River again supported the largest harvest of Dolly Varden on the road system (Table 11).

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource.

RECENT BOARD OF FISHERIES ACTIONS

The last regulation affecting Dolly Varden was adopted during the 1987 Alaska Board of Fisheries meeting. The bag and possession limit for Dolly Varden was reduced from 20 to 10 fish daily and in possession. This change was adopted to prevent the overharvest of Dolly Varden stocks that occur within the Kodiak Road System.

CURRENT ISSUES

Emigration counts from the Buskin River drainage were 91,107, 30,725 and 74,451 Dolly Varden in 1990, 1991 and 1992, respectively (Table 12). The decrease of 60,000 fish in 1991 may have been due to a large decrease in population size or the population may have overwintered in salt water or elsewhere outside the Buskin drainage during the winter of 1990-1991. If the poor emigration count during 1991 (30,725 Dolly Varden) was due to a large decrease in population size, then we might expect to find a reduced number of spawning fish on the major spawning grounds (American and Olds rivers). Significant reductions of spawning fish could indicate the need for fishery restrictions to assure adequate numbers of spawning fish. Research to address these concerns was conducted in the fall of 1993 and is discussed below.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A major research program was conducted between 1986 and 1992 to assess the stock structures and sustainable yields of Dolly Varden in the Chiniak Bay area (Murray 1987, 1988a, 1989, 1990; Whalen 1991, 1992, 1993). The project included operation of weirs to count emigrating Dolly Varden from Buskin, Genevieve and Louise lakes (all within the Buskin River drainage), and mark-recapture experiments to determine population size and composition at fall spawning grounds.

Results of this work indicate that Chiniak Bay Dolly Varden exhibit a similar life history to that documented for anadromous Dolly Varden in southeastern Alaska. Buskin Lake appears to provide the major overwintering site for Chiniak Bay Dolly Varden stocks. Dolly Varden migrate out of Buskin Lake during the spring and reside primarily in marine waters during the summer. During late summer and fall, they enter streams primarily in the Chiniak Bay area to feed and/or spawn. While the Buskin drainage is the major overwintering site, it is not the only spawning system. Other major spawning locations for Dolly Varden that overwinter in Buskin Lake include the American and Olds rivers, both of which are tributaries of Chiniak Bay.

Throughout late summer and fall, Dolly Varden return to Buskin Lake to overwinter. Because of these life history characteristics, the Dolly Varden of Chiniak Bay can be considered one stock for purposes of fisheries management.

The point estimate of 5,881 spawning fish in 1993 was the highest ever recorded for the American River, although its 95% confidence limits overlap with past estimates (Table 13). The dramatic population drop observed at the Buskin River weir in 1991 does not appear to have resulted in a noticeable reduction in the 1993 American River spawning population. The point estimate of 8,454 spawning Dolly Varden in 1993 is the highest recorded for the Olds River since research began in 1988, although its 95% confidence limits overlap with past estimates (Table 13). We did not detect a drop in the Olds River spawning population linked to the low 1991 weir count. Even if the lower limits of the population estimates are used, the 1993 spawning populations appeared to be at least average in size.

In summary, the dramatic decrease in the size of the overwintering population in Buskin Lake counted in the spring of 1991 did not result in a reduction in the number of spawning fish in the Olds and American rivers in 1993. The overwintering population has been very large (ranging from 30,000 to 90,000 fish) in comparison to the number of spawners in the Olds and American rivers (fewer than 15,000 fish). The Buskin River and Lake population can fluctuate dramatically from year to year, but not suffer a decline in stock reproductive potentials as long as the abundance of spawning fish is not reduced. Sport harvest of Dolly Varden from the Buskin River, which now averages less than 5,000 fish annually, is not significant in comparison to the fluctuations we have observed, and is not likely to affect the population size. However, sport harvest of the spawning populations should be monitored to assure that the spawning stock is not significantly reduced.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

The last population abundance research was conducted in the spring of 1992 and fall of 1993. The large emigration count of 74,451 Dolly Varden from Buskin Lake, and the large spawning population estimates on the American and Olds rivers in the fall of 1993 both indicated that the Dolly Varden population was above average abundance and remained stable when compared to other years. Since future population monitoring is not scheduled, sport catches will be used as an indicator of population abundance.

It is important to focus on catches and not harvests when using the sport fishery as an indicator of population size. Since 1992 there has been a trend for anglers to release Dolly Varden, and road system harvests have averaged only 4,220 fish since 1992, less than half the pre-1992 average (Table 10). However, catches have remained high, averaging 24,000 fish annually since 1992.

A weakness in using sport fish catch as a measure of Dolly Varden population size is made incidental to salmon fishing The total Dolly Varden catch is influenced by the amount of fishing effort that occurs during salmon fisheries. Effort may vary from year to year based on weather conditions and run strength. Therefore, the incidental Dolly Varden catch may vary from year to year based on fishing effort for other species and is not directly comparable.

Keeping these limitations in mind, sport fish catches will be used as a general indicator of Dolly Varden abundance. If Dolly Varden catches drop significantly below average, mark and

Table 13.-American and Olds rivers Dolly Varden population abundance estimates, 1988-1993.

American River				
			95% Confidence Interval	
Year	Abundance	SE	Lower limit	Upper limit
1988[a]	3,048	419	2,227	3,869
1989[b]	4,125	805	2,547	5,703
1990[c]	3,947	540	2,889	5,005
1991[d]	3,375	469	2,456	4,294
1993[e]	5,881	1,352	3,232	8,530

Olds River				
			95% Confidence Interval	
Year	Abundance	SE	Lower limit	Upper limit
1989[b]	3,856	545	2,783	4,924
1991[f]	2,669	197	2,283	3,055
1993	8,454	2,715	3,132	13,775

[a] S. Sonnichsen, Alaska Department of Fish and Game, Anchorage, personal communication.

[b] Sonnichsen 1990.

[c] Whalen 1991.

[d] Whalen 1992.

[e] The length distribution shifted between events in 1993, indicating that this estimate may be biased.

[f] Whalen 1992. This estimate is biased due to unequal capture probabilities between sublocations and among size groups.

recapture spawning population estimates can be made on the American and Olds rivers to determine if the population has declined and if fisheries restrictions should be implemented.

KODIAK ROAD SYSTEM PINK SALMON FISHERY

HISTORICAL PERSPECTIVE

Pink salmon return to Kodiak Road System streams from mid-July through early September. Peak immigration typically occurs during the second week of August. Spawning occurs in stream reaches both upstream and downstream of road system bridges beginning in August.

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon year-round. The remaining streams along the Kodiak Road System that flow into Monashka and Chiniak bays are open to salmon fishing year-round in the reaches downstream of the highway bridges. Waters upstream of Bridge No. 1 on the Buskin River and upstream of the highway bridges on remaining streams are closed to salmon fishing from August 1 through September 15. The bag and possession limit for salmon other than chinook over 20 inches in length is 5, no more than 2 of which may be sockeye or coho salmon.

From 1986 through 1995, fresh and salt waters of the Kodiak Road System have accounted for an average harvest of 10,030 pink salmon (Table 14). This represents an average of 60% of the total KMA pink salmon harvest over this period. About 60% of this harvest has been from freshwater systems (Table 14). Pink salmon returning to streams along the Kodiak Road System are also harvested in commercial and subsistence fisheries (Appendices C and D). Commercial harvests are larger than sport harvests whereas subsistence harvests are significantly smaller than sport harvests.

Major sport fisheries for pink salmon in the Kodiak Road System occur on the Buskin, Pasagshak, American, and Olds rivers. Over the last 10 years, these four river systems have accounted for an average harvest of 5,630 pink salmon, or 56% of the total Kodiak Road System pink salmon harvest (Table 15). Of these systems, the Buskin River has supported the largest fishery for pink salmon. Since 1986, the average harvest of pink salmon from the Buskin River has been 2,940 fish (Table 15). Other significant fisheries for pink salmon in this area occur along the shorelines and marine waters of Chiniak and Ugak bays.

RECENT FISHERY PERFORMANCE

The pink salmon runs along the Kodiak Road system were generally weak from 1990-1992. Commercial harvests of pink salmon in Monashka and Chiniak bays averaged approximately 275,000 from 1980 to 1988 but decreased to approximately 121,000 from 1990-1992 (Appendix C). Combining the highest aerial survey counts for each year in the three largest producers (Buskin, American and Olds rivers) during the years 1980 to 1988 yielded a combined average count of over 200,000 pink salmon; this figure decreased to 85,000 during 1990-1992 (Appendix F). During this time period of reduced commercial harvest and escapement sport fish harvest also declined. The 1986-1989 average pink salmon sport fish harvest along the Kodiak Road system declined from 13,710 to 7,000 in 1990-1992 (Table 14). The 1993 road system harvest of 10,790 was more in keeping with past years.

The 1994 road system harvest of pink salmon was estimated by the SWHS at 4,240. This is the lowest harvest on record. Although the harvest was low, anglers released over five fish

Table 14.-Harvest of pink salmon from Kodiak Road System waters of the Kodiak Management Area, 1986-1995.

	Kodiak Road System					
Year	Freshwater Harvest	Saltwater Harvest	Total Harvest	% of KMA	KMA Harvest	Release
1986	8,594	3,699	12,293	71	17,365	
1987	6,157	4,710	10,867	80	13,532	
1988	8,968	7,638	16,606	53	31,296	
1989	9,820	5,269	15,089	52	29,176	
1990	4,841	1,695	6,536	22	29,997	35,533
1991	5,930	4,313	10,243	85	12,106	22,166
1992	3,031	1,345	4,376	38	11,473	29,454
1993	6,159	4,610	10,789	69	15,570	47,822
1994	2,979	1,261	4,240	70	6,032	20,559
1995	5,532	3,776	9,308	71	13,185	36,050
MEAN	5,806	3,832	10,034	60	17,973	31,930

Note: Through 1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 15.-Harvest of pink salmon from selected Kodiak Road System streams, 1977-1995.

	Buskin River		Pasagshak River		American River		Olds River		Total	
Year	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
1977	3,868		1,423						5,291	
1978	4,752		1,006						5,758	
1979	4,036		1,173						5,209	
1980	6,122		1,731						7,853	
1981	3,856		713						4,569	
1982	7,357		94						7,451	
1983	4,196		178		430		199		5,003	
1984	4,701		499		835		611		6,646	
1985	3,812		501		380		440		5,133	
1986	5,810		321		948		1,086		8,165	
1987	2,354		706		1,729		1,105		5,904	
1988	5,202		327		1,310		982		7,821	
1989	4,402		804		1,397		2,325		8,928	
1990	2,841	4,705	183	487	1,000	2,742	488	1,938	4,512	9,872
1991	1,942	2,430	601	1,124	1,472	3,170	1,246	1,916	5,261	8,640
1992	1,557	3,710	403	559	513	2,070	476	2,409	2,949	8,748
1993	1,104	5,276	381	927	560	6,400	2,676	7,712	4,721	20,315
1994	751	3,102	81	398	314	2,166	694	3,926	1,840	9,592
1995	2,367	4,621	193	922	688	5,277	1,134	3,427	4,382	14,247
MEAN (86-95)	2,944	3,974	416	736	1,004	3.638	1,230	3,555	5,631	11,902

for every fish harvested in selected index streams (Table 15). The reason for the low sport fish harvest is unclear as road system stream escapements were above average (Appendix F1).

The 1995 pink salmon return along the Kodiak road system was above average as were most stream escapements (Appendix F1). The commercial harvest in the road system zone of approximately 1,175,000 (Appendix C1) also indicates a large return. The sport harvest of 9,310 pink salmon in fresh and saltwater along the Kodiak road system was average when compared to the past 10 years. Sport catches for 1996 are not available yet, however, stream escapements during 1996 along the road system were achieved (Appendix F1).

RECENT BOARD OF FISHERIES ACTIONS

The Alaska Board of Fisheries adopted a staff proposal that extended the upriver salmon fishing closure from August 1 through September 10 to August 1 through September 15. The regulation became effective during the 1996 fishing season, and streams draining into Monashka and Chiniak bays were closed to salmon fishing upstream of the Chiniak Highway from August 1 through September 15, with the exception of the Buskin River which will be closed upstream of Bridge No. 1 from August 1 to September 15.

The last board action regarding pink salmon bag and possession limits on the road system occurred in 1987 when the bag and possession limit for salmon (other than chinook salmon) was reduced to 5 for fish over 20 inches in length of which not more than 2 may be coho salmon and 2 may be sockeye salmon. The limits had previously been 6 daily, only 2 of which could be coho salmon, and 12 in possession, only 4 of which could be coho salmon.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. Even-year minimum escapement goals for pink salmon have been established for the major streams producing pink salmon along the road system (Buskin 60,000; American 30,000; Olds 30,000). During odd years, minimum goals are: Buskin 100,000; American 30,000; and Olds River 30,000. The sport fishery will be managed so that spawning escapements approximate minimum spawning escapement goals.

CURRENT ISSUES

Pink salmon escapements to the Kodiak Road system commonly exceeded 500,000 fish during the 1980s (Appendix F1). During this same period, sport fish harvests averaged about 12,000 fish, or about 2% of the total inriver returns (Table 14). Under these conditions, manipulating the sport fish harvest would do little to effect achieving escapement goals. However, from 1990 to 1992 pink salmon returns along the road system were weak, and foregoing a sport harvest would add to the spawning escapement and reproductive potential of the stocks. The exceptionally poor return in 1992 prompted restrictions in the sport fishery. The bag limit was reduced along the Kodiak road system by emergency order to 2 fish per day and the fishery was closed in the Buskin, American and Olds rivers. The large returns since 1993 reversed this trend for poor returns. No restrictions are expected in the near future for this fishery. Inseason monitoring of returns will continue, and if spawning escapements are significantly below minimum goals, then the sport fishery will be restricted.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

No specific research or management activities are directed at this fishery. The weir on the Buskin River was not operated during the majority of the pink salmon return in 1996 due to budgetary constraints. This will likely continue in the future. Historical time-of-entry data for the Buskin River are listed in Appendix G2. Beginning in 1991, aerial surveys have been used to estimate the pink salmon escapement in area streams and will be continued.

OUTLOOK

The Division of Commercial Fisheries Management and Development conducts a research project in order to forecast the return of pink salmon. The forecasted commercial harvest for 1997 is approximately 21 million fish which is excellent for an odd year. Along the Kodiak road system returns are expected to vary by stream. Shortly after peak spawning in 1995, the Kodiak road system received 19 inches of rain, and this flooding affected spawning success differently in each stream. The Buskin River had some areas of good as well as poor spawning success. The American River appeared good throughout, while the Olds River appeared poor.

INSEASON MANAGEMENT APPROACH

The magnitude of the pink salmon return to the Kodiak road system will be judged using comparative commercial catch statistics and aerial survey data. If it appears that the return is significantly below average and minimum escapement goals will not be met the sport fishery may be restricted.

If restrictions on the fishery are necessary to achieve minimum escapements, these restrictions should be initiated on or before August 10, the normal peak of the return. The options for restricting the fishery are numerous and include lowering the bag limit, closing specific waters or decreasing fishing time. The option selected will be designed to minimize lost sport fishing opportunity, while maximizing increased spawning escapement.

It is recognized that the sport fishery generally does not greatly influence the reproductive potential of stock, largely because of the large spawning escapements involved and the relatively small sport harvests. For example, sport harvests during even years on the Buskin River have averaged approximately 4,340 fish since 1978. The minimum escapement goal for even years on the Buskin River is 60,000 fish. Even if spawning escapements were slightly below minimum, the sport removal of about 4,340 fish would not greatly impact the stock's ability to produce an abundant return. For this reason, the sport fishery will not be restricted unless it appears that spawning escapement will not be reached by a significant amount.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No additional research or management activities are recommended for this fishery at present. At this time, no changes in regulation are recommended with respect to this fishery.

KODIAK ROAD SYSTEM COHO SALMON FISHERY

HISTORICAL PERSPECTIVE

Wild and stocked coho salmon return to Kodiak Road System streams from late August through October. Peak immigration typically occurs during mid-September. Spawning occurs in stream reaches both upstream and downstream of road system bridges beginning in October. Beginning in 1984, anadromous coho salmon fingerlings have been stocked into seven different Kodiak

Road System drainages. Returns from these stocking efforts have established major sport fisheries in several locations along the Kodiak Road System. The largest fisheries occur at Mill Bay, Mission and Kalsin beaches. Fisheries for stocked returns also occur at Mayflower Beach. Stocking was discontinued at Kalsin Pond in 1994, and the last return from these stockings will occur in 1997. These releases have averaged 76,000 fingerlings from 1989 through 1996 (Table 9).

The intertidal reach of the Buskin River, considered to be the area downstream of Bridge No. 1, is open to the taking of salmon year-round. The Buskin River upstream of Bridge No. 1 is closed to fishing for all salmon from August 1 through September 15. The remaining streams along the Kodiak Road System which flow into Monashka and Chiniak bays are open to salmon fishing year-round in the reaches downstream of the highway bridges, and closed from August 1 through September 15 in reaches upstream of the highway bridges. The bag and possession limit for salmon other than chinook salmon is 5 salmon 20 inches or more in length, of which no more than 2 may be coho or sockeye salmon.

From 1986 through 1995, the average harvest of coho salmon from waters of the Kodiak Road System was 11,500, accounting for an average of 57% of the total KMA coho salmon harvest over this period (Table 16). About 66% of the Kodiak road system harvest has been from the Buskin, Pasagshak, Olds, and American rivers (Tables 16 and 17). Of these systems, the Buskin and Pasagshak rivers have supported the largest fisheries for coho salmon. Since 1986, the average harvest of coho salmon from the Buskin and Pasagshak rivers has been 3,160 and 2,050 fish, respectively (Table 17). Other significant fisheries for coho salmon in this area occur along the shorelines and marine waters of Chiniak and Ugak bays.

RECENT FISHERY PERFORMANCE

Anglers reported good catches in late August and early September, especially in the Buskin and Olds rivers. However, Kodiak experienced flooding in September and October which hampered fishing. September of 1995 was the second wettest September in history, with 19.44 inches of rainfall. October was also wetter that average, with 9.99 inches of rain.

The harvest figures presented in Tables 16 and 17 indicated that harvests were slightly below average in most streams. The total road system harvest of coho in 1995 was 9,170 compared to the 10-year average of 11,500 (Table 16).

A regulation adopted by the Board of Fisheries at its December 1995 meeting was in effect for the first time during the 1996 fishery. This regulation closed the upstream sections of rivers which flow into Monashka and Chiniak bays to salmon fishing from August 1 through September 15. In the past the upriver salmon closure date was August 1 through September 10. The inseason management approach stated that the upstream section of the Buskin River, where there is inseason escapement information provided by a weir, would be opened prior to September 15 if the return was large and escapement goals could be assured. Other streams where no inseason escapement information is available would remain closed through the dates established by regulation (August 1-September 15).

The Buskin weir had enumerated 3,300 coho by September 4, 1996. This large count assured that the goal of achieving a minimum count of 6,000 coho by October 1 would be exceeded. As

Table 16.-Harvest of coho salmon from Kodiak Road System waters of the Kodiak Management Area, 1986-1995.

Year	KMA Harvest	Kodiak Road System	
		Harvest	% of KMA
1986	25,458	14,007	55
1987	19,402	11,500	59
1988	21,379	13,475	63
1989	23,700	14,910	63
1990	20,065	8,364	42
1991	21,327	12,147	69
1992	16,920	7,676	45
1993	22,889	15,099	71
1994	14,600	8,645	59
1995	15,194	9,172	60
MEAN	20,093	11,500	57

Note: Through 1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 17.-Harvest of coho salmon from selected Kodiak Road System streams, 1977-1995.

Year	Buskin River	Pasagshak River	American River	Olds River	Total
1977	890	1,169			2,059
1978	1,018	1,043			2,061
1979	2,870	2,409			5,279
1980	2,643	2,480			5,123
1981	2,269	1,015			3,284
1982	2,431	1,100			3,531
1983	2,307	1,322	378	31	4,038
1984	1,871	1,646	486	561	6,140
1985	2,937	2,292	349	562	6,142
1986	4,251	2,951	826	1,651	9,679
1987	3,133	3,477	435	235	7,280
1988	3,474	2,637	1,710	1,273	9,094
1989	4,984	2,100	1,500	2,571	11,155
1990	1,521	2,105	849	948	5,423
1991	4,121	1,296	794	1,778	7,917
1992	1,474	1,733	583	1,085	4,875
1993	4,125	2,073	2,340	1,838	10,376
1994	2,429	973	642	1,082	5,126
1995	2,132	1,187	794	833	4,946
MEAN (86-95)	3,164	2,053	1,040	1,329	7,587

a result, the entire Buskin River was opened to salmon fishing on September 9. The upstream section (above the highway bridges) of other streams draining into Monashka and Chiniak bays remained closed to salmon fishing through September 15.

Fishing was excellent in the Buskin on September 9 when the entire river opened. Department personnel sampled over 100 coho that were harvested by anglers from the Buskin on September 9. Catches dropped off the next day, and although there were many fish in the river, angler catch rates dropped markedly. The total weir count of 8,440 documents that minimum escapement objectives were achieved (Table 18). Sport fish harvest figures for the 1996 season are not available yet, however, harvest in the Buskin River is expected to be at least average (3,000).

Harvest figures from the Pasagshak and Olds are also expected to be at least average, based on angler reports and escapement surveys which indicated good returns (Appendix E1). Harvest from the American and Roslyn rivers are conversely expected to be below average due to poor escapements. It is very likely that returns to the American River and Roslyn Creek will be very poor in 1999 and should be monitored closely in anticipation of the poor returns.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. The fishery will be managed so that a minimum spawning escapement of 5,300 coho will be achieved in the Buskin River. The fishery will also be managed so that other index coho systems along the road continue to receive sufficient spawning escapements (American and Olds rivers, Salonie Creek, Roslyn and Pasagshak rivers).

RECENT BOARD OF FISHERIES ACTIONS

During the December 1995 Kodiak Board of Fisheries meeting, background information was given to the Board explaining the regulation that closes salmon fishing in waters above the highway for streams that drain into Chiniak and Monashka bays from August 1-September 10 (and above Bridge No. 1 on the Buskin River). This regulation has been in effect for over 20 years. The original intent of this regulation was to protect spawning pink salmon. The lower rivers were left open to fishing and allowed anglers fishing opportunities for bright pink salmon and early arriving cohos. As fishing effort has increased for coho salmon in recent years, this upriver closure has been used by fisheries managers to protect coho as well as pink salmon stocks. If it appears that coho salmon are abundant and escapement goals will be achieved, these upriver areas will be opened to fishing as scheduled on September 11. If the return appears weak or cannot be evaluated, the upriver fishing closures will be extended so that harvests will be reduced and spawning objectives met. The main tool to evaluate inseason run strength is the Buskin River weir.

The Buskin River weir has been used to regulate fishing season for all the streams that drain into Chiniak and Monashka bays, however, the Buskin River return may or may not be indicative of the run strength in other nearby streams. Also by September 10 only about 30% of the return has occurred, making it difficult to assess run strength by this date. An additional problem is that several of the local index streams have shown below average year-end coho escapements.

In the Chiniak and Monashka bay coho salmon fisheries the season opening date had been delayed in 5 of the past 10 years. This created an unorderly fishery for the public and enforcement officials. Using the Buskin River weir to regulate the open season for all streams

Table 18.-Numbers of anadromous fish passed through the Buskin River weir, 1985-1996.

Year	Dolly Varden Emigration	Steelhead Kelts[a]	Sockeye Salmon	Pink Salmon[b]	Dolly Varden Immigration	Coho Salmon[f]	Chum Salmon	Chinook Salmon
1985	21,797	223	18,010	153,026	20,540	9,474	7	
1986	41,659	71	8,939	98,958	24,110	9,939	51	
1987	29,919	105	12,690	27,892	32,848	11,103 [g]	79	
1988	30,336	357	12,144	203,578	34,386	6,782 [g]	84	
1989	35,603	205	17,853	159,123	33,306	9,930 [g]	79	
1990	91,107 [c]	150 [d]	10,528 [h]	42,889	6,416 [e]	6,222	18	
1991	30,725 [c]	148 [d]	9,789	37,636 [i]	812 [i]	8,929	21	
1992	74,451 [c]	201 [d]	9,782	25,141 [i]	868 [i]	6,535	9	6
1993	140 [j]	13 [j]	9,526	53,484 [i]	4,960 [i]	6,813	22	8
1994	0 [j]	19 [j]	11,783	89,711 [i]	220 [i]	8,146	17	7
1995	0 [j]	15 [j]	15,520	72,820 [i]	5,401 [i]	8,694	43	8
1996	0 [j]	7 [j]	9,661	50,550	8,075 [i]	8,439	67	7

[a] Steelhead kelts are fish which have overwintered in the lake, spawned in the river during the spring, and are returning to the sea.

[b] Does not include an estimated 18,000, 12,000, 2,500, 30,000, 28,000, and 11,563 pink salmon spawning below the weir in 1985, 1986, 1987, 1988, 1989, and 1990, respectively.

[c] A small Vexar mesh was placed over the weir in order to obtain a complete count during 1990, 1991, and 1992. Prior to 1990 only fish greater than 300 mm were effectively counted. Starting in 1990 the weir was moved to the outlet of Buskin Lake.

[d] The weir was moved to Buskin Lake outlet. These steelhead were not kelts but prespawning ripe fish.

[e] A flood during peak immigration made it impossible to estimate migration. This figure is a partial count.

[f] A total of 350, 400, and 600 coho were estimated below the weir when it was removed in 1986, 1987, and 1988, respectively. These estimates were added to the weir counts.

[g] The 1987 return of coho was enhanced by the stocking of 40,000 fry in 1984, the 1988 return by the stocking of 44,000 fry in 1985, and the 1989 return by the stocking of 50,000 fry in 1986.

[h] Since 1990 the weir was moved upriver to the outlet of Buskin Lake. Sockeye entering the tributary lakes of Louise and Genevieve are not counted at the upriver location.

[i] The weir was not operated during late July and early August. Pink salmon counts have been expanded by aerial surveys or time of entry data in order to estimate escapement. Dolly Varden immigration counts are incomplete and have not been expanded to estimate a total immigration.

[j] The weir was not operated in April and May. These counts are incomplete and have not been expanded to estimate total escapement.

had lead to a situation where escapement goals were achieved on the Buskin River but sometimes were not achieved in other index streams. The department proposed a regulation change in an attempt to improve management of this fishery. The regulation delayed the upriver opening date until September 16. A delayed opening date should help increase escapements into index streams and serve to minimize public confusion regarding opening dates. The upriver opening date on the Buskin River would also be delayed until September 16, allowing the department more time to evaluate run strength. If escapement objectives in the Buskin River could be assured at an earlier date, then the upriver section of the Buskin River could be opened earlier than September 16. This proposal was expected to increase the orderliness of the fishery and result in achieving escapement objectives in all area streams. The Board accepted this proposal, and the regulation was implemented during the 1996 fishing season.

CURRENT ISSUES

Based on informal angler interviews, it appears that the recreational fishery for coho salmon in the Kodiak Road System is the most popular sport fishery in the Kodiak Management Area. Since 1986 the Kodiak road system coho salmon sport harvest has averaged 57% of the total coho salmon harvest in the entire KMA (Table 16). The sport harvest on the road system has averaged 11,500 fish followed by the commercial fishery of 6,520 (Appendix C) and the subsistence fishery of 2,740 fish (Appendix D). Due to its proximity to the town of Kodiak and high angler interest, the sport fishery has the potential to overharvest coho salmon. In order to document the history of road system coho salmon stocks so that these populations and fisheries can be studied and managed, a report was written entitled "Salmon Harvest and Escapement Data for the Chiniak Bay and Kodiak Road System, 1980-1990" (Schwarz 1993). In this report harvest from all fisheries, run timing, escapement and stocking statistics for the years 1980-1990 were compiled. This report along with data in recent Kodiak area annual management reports can be used to evaluate stock status and effectiveness of management practices.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A weir on the Buskin River and foot or aerial surveys on other area streams are currently used to estimate escapement levels. Scale samples are taken from the Buskin River sport harvest as well as during the coho egg take so that brood tables can be developed and escapement goals refined.

INSEASON MANAGEMENT APPROACH

As stated under the section on recent Board of Fisheries Actions, a new regulation became effective in 1996, where streams that flow into Monashka and Chiniak bays will be closed to salmon fishing from August 1 through September 15 upstream of the Chiniak Highway and upstream of Bridge No. 1 on the upriver sections of the Buskin River. Streams other than the Buskin will open on September 16. The Buskin River weir will be used to monitor coho escapement into the Buskin River. The upriver section will be opened earlier or later than the scheduled September 16 opening day in response to run timing and strength. The section of the Buskin River above Bridge No. 1 may be opened before September 16 if it appears that minimum escapement objectives will still be met, even if the fishery is opened early. (In order to achieve a minimum weir count of 6,000 coho by October 1, the weir count on September 7 must be about 1,700 fish [Appendix G3]. A final weir count of 6,000 coho ensures that the minimum spawning objective of 5,300 coho will be achieved after the upriver sport fishery takes place). The upriver opening date may also be delayed past September 16 if escapement objectives are

not assured. To open the upriver section on the September 16 regulation date and still assure escapement objectives are met, a weir count of 2,400 must be achieved by the end of counting on September 12. The evaluation should be made by September 12 so that if the upriver closure needs to be extended past September 16, there will be time to notify the public.

If the upriver closure is not sufficient to ensure minimum escapements are achieved, additional restrictions may be implemented (reduction in bag limits, additional area closures or time closures). The weir count by October 1 should be 6,000 in order to ensure that 5,300 spawning fish remain after the sport fish removal.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Maintaining operation of the Buskin River weir to document inseason run strength for the largest and most heavily fished return of coho on the Kodiak Road System is essential. This management tool allows for conservation and maximizes fishing opportunities.

Smaller streams also provide fishing opportunities on the Kodiak road system: Monashka, Pillar, Sargent, Russian, Salonie, American, Olds, Roslyn, Chiniak, Pasagshak, Saltery and Miam. The only way to evaluate whether the existing management system is effectively providing for stock conservation is to monitor escapement levels in these streams annually. Although escapement surveys are conducted after all fisheries have taken place, they still provide the data necessary to detect trends in abundance. If decreasing levels of abundance were noted over 2 to 3 years then the management strategy could be adjusted to better provide for stock conservation. Without documenting escapement after the fisheries have occurred it is difficult to evaluate management strategies. It is recommended that these streams be surveyed at least once to document spawning escapement. The six largest streams should be surveyed twice. Results of these surveys are listed in Appendix E. Roslyn Creek and the American River should be monitored closely in 1999, the expected year of return from the 1996 brood year. Escapement counts of 6 coho in Roslyn and 69 fish in the American were the lowest on record and will probably produce poor returns. Complete closure of these streams during the 1999 coho run is possible.

As fishing effort for coho salmon along the road system continues to increase, the stocking program will increase in importance. This project provides additional fishing opportunities as well as relieving fishing pressure on the wild stocks. The 1994 Statewide Harvest Survey documented a harvest of 362 coho with 1,977 angler days at Mill Bay, a return location for stocked adults. In 1994 the SWHS estimated 1,839 angler-days expended with a harvest of 217 coho salmon from the shoreline at Mission Beach (M. Mills, ADF&G, Anchorage, personal communication). Starting in 1993, brood source eggs were taken from the Buskin River instead of from the Afognak River. The change in this program was initiated over concerns that returning adults would stray into local streams and genetically mix with wild stocks. Buskin coho typically return 2 to 3 weeks later than Afognak coho. Fishing opportunities in mid to late August for stocked coho will be lost due to the change in brood source. The Kodiak Regional Aquaculture Association is incubating and rearing Buskin River coho salmon eggs free of charge at the Pillar Creek fish hatchery. This project has very little cost to the State but provides angling opportunities and should be continued.

KODIAK ROAD SYSTEM SOCKEYE SALMON FISHERY

HISTORICAL PERSPECTIVE

Three sockeye salmon populations are present along the Kodiak Road system: the Buskin, Pasagshak, and Saltery river populations. Sockeye salmon return to Kodiak Road system lakes from June through August with peak immigration varying by stream. Saltery supports the latest returning sockeye salmon run on the road system. Because of the limited access into Saltery Cove (4-wheel drive or float plane) the Buskin and Pasagshak receive most of the fishing effort. Spawning occurs in mid August.

The bag and possession limit is 5 salmon 20 inches or more in length, of which no more than 2 may be sockeye or coho salmon. A new regulation went into effect during 1996 which allows anglers to retain 5 sockeye from the Saltery drainage. From 1986 through 1995, the average harvest of sockeye salmon from waters of the Kodiak Road system has been 3,510, accounting for an average of 41% of the total KMA sockeye salmon harvest over this period (Table 19). About 80% of the road system harvest has been from the Buskin, Pasagshak and Saltery rivers (Table 20)

RECENT FISHERY PERFORMANCE

The sport harvest of sockeye salmon from Kodiak Road System waters during 1995 (2,900) was slightly below average (Table 19). This harvest accounted for 31% of the total sockeye salmon harvest from KMA waters during 1995. Usually the Buskin and Pasagshak rivers support the largest harvest of sockeye salmon (Table 20). However, as in 1994, Saltery supported a larger harvest (652) than the Pasagshak (571) in 1995. Harvest estimates are not available for 1996 yet, however, it is expected that the Saltery harvest will increase over past years as anglers begin to take advantage of the increase in the daily bag limit from 2 sockeye to 5 sockeye.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource. The Buskin River fishery will be managed so that a minimum spawning escapement of 8,000 fish is achieved in Buskin Lake. The minimum spawning escapement objective in Saltery is 20,000 sockeye. Escapement trends will be monitored in Pasagshak, through aerial surveys, to ensure minimum escapement goals are being achieved. Aerial survey counts have varied considerably since 1980 but have averaged 9,000 fish (Appendix F).

RECENT BOARD OF FISHERIES ACTIONS

At the December 1995 Board of Fisheries meeting in Kodiak the Board accepted a public proposal to increase the daily bag limit at Saltery Cove to 5 sockeye. The previous bag limit for salmon other than chinook was 5, only 2 of which could be coho or 2 of which could be sockeye. The Board concluded that since the minimum escapement goal of 20,000 had been doubled every year for the past 5 years and that sport catch and effort was relatively low due to restricted access, that raising the bag limit from 2 sockeye to 5 sockeye would not jeopardize stock conservation or change the character of the fishery. The possession limit was not changed and remains one daily bag limit (5 salmon over 20 inches).

Table 19.-Harvest of sockeye salmon from Kodiak Road System waters of the Kodiak Management Area, 1986-1995.

Year	Kodiak Road System		KMA
	Harvest	% of KMA	Harvest
1986	3,424	54	6,233
1987	2,590	56	4,562
1988	4,166	47	8,853
1989	4,004	30	13,173
1990	2,901	35	8,224
1991	2,814	55	5,049
1992	3,140	37	8,408
1993	3,685	47	7,849
1994	5,418	40	13,502
1995	2,918	31	9,333
MEAN	3,506	41	8,519

Note: Through 1993 the Kodiak Road System figures were calculated by adding figures listed for the Buskin, American, Olds, Pasagshak and Saltery rivers, roadside lakes, Chiniak Bay shore, Mill Bay Beach and other fresh waters on the Kodiak Road System as identified from responses to the Statewide Harvest Survey.

Table 20.-Harvest of sockeye salmon from selected Kodiak Road System streams, 1977-1995.

Year	Buskin River	Pasagshak River	Saltery Cove Streams	Total	% of KMA
1977	228	176		404	
1978	493	85		578	
1979	424	236		660	
1980	388	284		672	
1981	173	205		378	
1982	304	199		503	
1983	1,233	192		1,425	
1984	1,179	374		1,571	
1985	3,484	182		3,666	96
1986	2,339	428		2,767	81
1987	1,503	417		1,920	74
1988	2,274	819		3,093	74
1989	1,816	1,244	390	3,450	86
1990	998	1,018	417	2,433	84
1991	1,575	815		2,390	85
1992	1,981	427	518	2,926	93
1993	1,544	543	563	2,650	72
1994	2,573	861	1,237	4,671	86
1995	1,087	571	652	2,310	66
MEAN (86-95)	1,769	714	630	2,861	80

CURRENT ISSUES

Due to its proximity to the town of Kodiak, the Buskin River sockeye salmon resource receives considerable sport and subsistence fishing pressure. The subsistence fishery is the major user with harvests averaging 4,950 sockeye salmon from 1986-1995 (Appendix D). Over this same period, the average sport harvest of sockeye salmon from the Buskin River was 1,530. There is no directed commercial fishery on Buskin River sockeye salmon stocks. The average commercial harvest in Womens Bay during nondirected commercial fisheries from 1980-1995 was 100 sockeye (Appendix C). Since 1985, the average escapement of sockeye salmon to the Buskin River weir has been 12,190 (Table 18). Current exploitation rates appear to be sustainable. However, escapement must be monitored to ensure that the reproductive potential of the stock is not diminished as user group demands increase.

The subsistence sockeye fishery along Pasagshak Beach is developing rapidly. Subsistence harvest averaged less than 100 fish during the late 1980s, but increased to over 1,500 fish by 1992 (Appendix D). The subsistence fishery now harvests slightly over double what the sport fishery harvests. It will continue to be important to monitor spawning escapements as demand on this resource grows.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

A weir is currently operated on the Buskin River to count immigrating sockeye salmon. Scale samples are being collected from the escapement as well as from the subsistence harvest so that brood year tables can be constructed and escapement goals evaluated. Currently subsistence harvests are tabulated from returned permits. Sport harvests are obtained through the Statewide Harvest Survey (Howe et al. 1996).

INSEASON MANAGEMENT APPROACH

A minimum biological escapement goal for the Buskin River of 8,000 sockeye is currently under review for formal adoption and in the interim is being used to manage the fishery. Since 1985, sockeye have been enumerated through a weir on the Buskin River and time of entry data and is summarized in Appendix G1. If escapement counts through the weir drop to a point where a minimum escapement of 8,000 sockeye cannot be assured, then the sport fishery will be restricted. Restrictions could consist of reducing the bag limit or closing specific areas or times, depending on the size of the escapement shortfall.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Staff recommends continued operation of the weir on the Buskin River to count immigrating sockeye salmon. Also, biological sampling of the escapement and subsistence harvest should be continued so that brood tables can be constructed.

KODIAK ROAD SYSTEM LANDLOCKED LAKES STOCKED FISHERIES

HISTORICAL PERSPECTIVE

Stocking is currently being used to increase and diversify the opportunities for sport fishing on Kodiak Road System landlocked lakes. Several species of fish at various life stages have been stocked, including rainbow trout fingerlings, Arctic grayling fry, and coho salmon fingerling.

Regulations governing the stocked lakes vary by species. Within the Kodiak Road System, with the exception of the Saltery and Buskin lake drainages, populations of rainbow trout are limited to hatchery-produced fish planted into landlocked lakes; the bag and possession for rainbow trout is 10 fish, only 1 of which may be 20 inches or more in length. Daily bag and possession limits for Arctic grayling are 10 fish with no size limits. Bag and possession limits for salmon other than chinook salmon are 10 per day, 10 in possession for fish less than 20 inches.

From 1986 through 1995, an average of 1,350 angler-days has been expended by recreational anglers fishing landlocked lakes along the Kodiak Road System (Table 21). This effort has represented on average only about 1% (Table 21) of the total sport fishing effort expended by recreational anglers fishing KMA waters over this period (Howe et al. 1996). The average harvest of rainbow trout and nonanadromous salmon from stocked lakes from 1986 through 1995 has totaled 590 and 68 fish, respectively (Table 21). Arctic grayling releases were terminated in 1995 because the fry releases were not generating fishable populations of adult fish. Road system harvests of rainbow trout have represented nearly half of the harvests of rainbow trout in the KMA. During 1996, approximately 62,000 rainbow fingerlings were stocked along the Kodiak road system (Table 9). An additional 5,000 rainbow trout fingerlings were stocked in a lake next to the Chignik runway. A total of 6,095 coho fingerlings were stocked in two landlocked lakes on the Kodiak Road System in 1995. Fish were stocked in Pony (also called Sawmill Lake) and Southern Lake on Long Island. Fish were not stocked in 1996 because they were not available.

MANAGEMENT OBJECTIVES

The management objectives for this fishery are to provide angling opportunities and diversity through a landlocked lake stocking project.

RECENT BOARD OF FISHERIES ACTIONS

The Board of Fisheries has taken no specific actions with respect to this fishery in recent years. At the December 1995 meeting in Kodiak the Board rejected a public proposal that would have allowed six poles to be fished through the ice in the road system zone. The Board rejected this proposal because it did not maintain the character of a sport fishery. Currently each angler is allowed to fish with two poles through the ice.

CURRENT ISSUES

Effort and harvest of these stocked fish have remained relatively low (Table 21). The costs for these projects are also relatively low, averaging less than $4,000 per year for all species combined. There are no major management issues regarding this fishery at present.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Several lakes currently stocked are located on private property. An agreement to grant public access should be obtained from the landowner if these lakes are continued to be stocked.

The Arctic grayling catch and harvest have remained very low from the four lakes which are stocked. Because a fishery failed to develop for grayling, stocking was terminated in 1995 and the program was discontinued.

Table 21.-Number of angler-days of sport fishing effort and number of rainbow trout and landlocked salmon harvested by anglers fishing roadside lakes along Kodiak Road System, 1986-1995.

	Effort (Angler-Days)			Rainbow Trout Harvest			Landlocked Salmon Harvest		
Year	Lakes	KMA	% of KMA	Lakes	KMA	% of KMA	Lakes	KMA	% of KMA
1986	582	98,479	1	367	928	40	0	726	0
1987	1,390	98,969	1	1,394	1,849	75	434	1,116	39
1988	1,646	91,631	2	490	964	51	0	18	0
1989	969	110,868	1	787	1,861	42	60	1,587	4
1990	1,475	116,197	1	812	1,528	53	35	1,330	2
1991	1,541	139,478	1	472	1,296	36	0	0	0
1992	2,261	107,482	2	901	1,179	75	151	887	17
1993	1,186	114,286	1	98	483	20	0	3,087	9
1994	1,277	116,413	1	470	731	64	0	0	0
1995	1,203	99,181	1	151	321	47	0	0	0
MEAN	1,353	109,298	1	594	1,114	50	68	875	8

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Greater public education of the sport fishing opportunities in stocked lakes is recommended to increase utilization of these stocked fish. A map of stocked lakes with display pictures of successful anglers fishing through the ice and in open waters should be developed. The map could be displayed at the Kodiak Fish and Game office to help make anglers aware of fishing opportunities in stocked lakes.

ADAK ISLAND FISHERIES

Adak Island is situated approximately mid-way on the Aleutian Island chain (Figure 7). The community of Adak and a large U.S. Naval Base on the island are the major population centers. During the early 1990s approximately 5,500 people lived on Adak. All fisheries on the island can be accessed either by road or small boat launched from the community of Adak.

The marine and fresh waters of Adak Island supported the third most popular fisheries in the KMA in terms of recreational angling effort expended since 1986 (Table 3, Figure 2). Since 1986, these waters have accounted for nearly 15% of the recreational angling effort expended in the KMA, averaging 11,890 angler-days (Table 3).

The Navy Base on Adak is in the process of closing, and the population in 1995 was reduced from 5,000 people to 100 people. The base is scheduled for complete closure in 1997. The 1995 angling effort dropped to 2,010 angler-days, an 84% reduction in angling effort from the 1986-1995 average. The closure of the navy base and subsequent cessation of the sport fishery at Adak will cause a 50% reduction in angling effort in the Alaska Peninsula/Aleutian Islands Regulatory Area.

ADAK SPORT FISHERY 1995

Only 23 anglers reported fishing from Adak in the 1995 Statewide Harvest Survey. Of the 23 responses received, 11 fished from boats in salt water, 4 from the saltwater shore, and 8 fished in fresh water. The estimated total fishing effort was 2,010 angler-days (M. Mills, ADF&G, Anchorage, personal communication). Estimated harvests included 212 sockeye, 561 pink salmon, 47 coho salmon, 677 Dolly Varden, 19 rainbow trout and 188 halibut (M. Mills, ADF&G, Anchorage, personal communication). Tables 22 and 23 were developed to document this decline. The Dolly Varden harvest dropped from an average of 2,730 (1982-1995) to 680 in 1995 (Table 22). Table 23 shows that the Adak pink salmon harvest averaged 5,090 fish from 1982-1995, but dropped to 561 fish in 1995. The Adak pink salmon harvest used to account for 24% of the entire management area pink salmon harvest but fell to 4% in 1995. The sockeye harvest dropped from an average harvest of 1,050 to 210 fish. The coho harvest dropped from an average harvest of 960 to 471 fish. Angling effort and harvest are expected to continue to decline as the base nears complete closure.

AFOGNAK/SHUYAK ISLAND FISHERIES

The Afognak/Shuyak Island group lies northeast of Kodiak Island. For purposes of this discussion, the group includes the fresh and nearby salt waters surrounding Afognak, Shuyak, Raspberry, Whale, and Marmot islands (Figure 8).

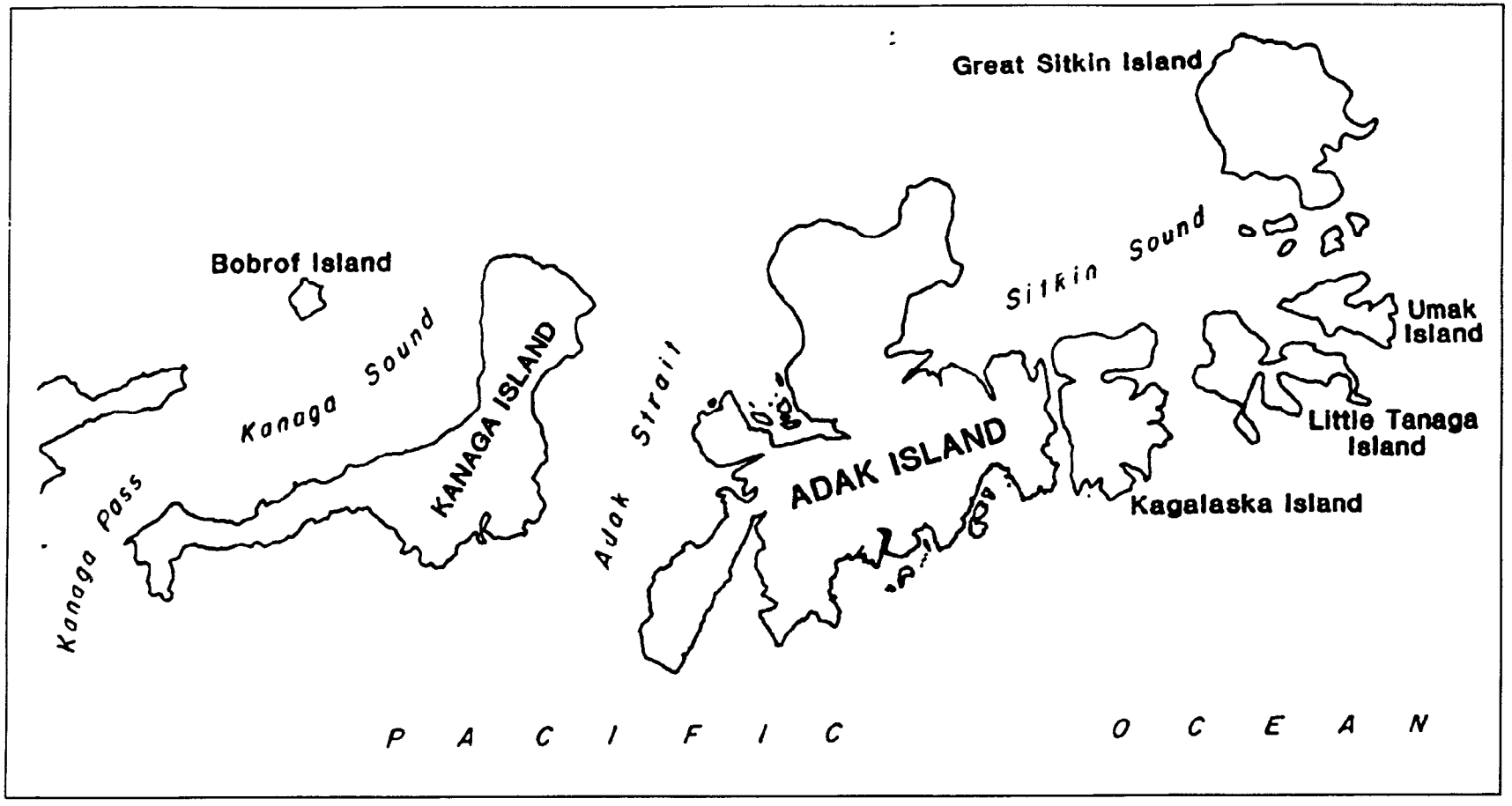

Figure 7.-Adak Island and surrounding waters.

Table 22.-Harvest of Dolly Varden from Adak Island waters of the Kodiak Management Area, 1982-1995.

	KMA	Adak Island	
	Harvest	Harvest	% of KMA
1982	36,065	3,365	9
1983	30,192	4,374	15
1984	28,528	3,254	11
1985	22,562	2,653	12
1986	26,459	2,819	11
1987	15,831	3,631	23
1988	22,592	1,237	6
1989	18,635	3,137	17
1990	21,052	5,591	27
1991	21,418	3,036	14
1992	11,525	2,007	17
1993	10,233	2,247	22
1994	6,608	215	3
1995	9,263	677	7
MEAN	20,069	2,732	14

Table 23.-Harvest of pink, coho, and sockeye salmon from Adak Island waters of the Kodiak Management Area, 1982-1995.

	Pink Salmon				Coho Salmon		Sockeye Salmon	
Year	Freshwater	Saltwater	Total	% of KMA	Harvest	% of KMA	Harvest	% of KMA
1982	2,170	6,571	8,741	29				
1983	713	1,783	2,496	19				
1984	304	3,786	4,090	24				
1985	1,907	0	1,907	12	311	4	149	2
1986	2,267	233	2,500	14	698	3	218	4
1987	1,143	127	1,270	9	86	1	81	2
1988	10,272	495	10,767	34	1,021	5	2,816	32
1989	3,405	4,730	8,135	28	2,236	11	2,366	18
1990	9,939	9,549	19,488	65	3,658	18	1,832	22
1991	4,257	2,204	6,461	31	1,571	7	1,450	18
1992	2,894	1,512	4,406	28	566	3	649	8
1993	1,227	384	1,611	10	411	2	1,627	15
1994	102	85	187	3	0	0	161	1
1995	290	271	561	4	47	0	212	1
MEAN	2,920	2,266	5,094	24	964	5	1,051	11

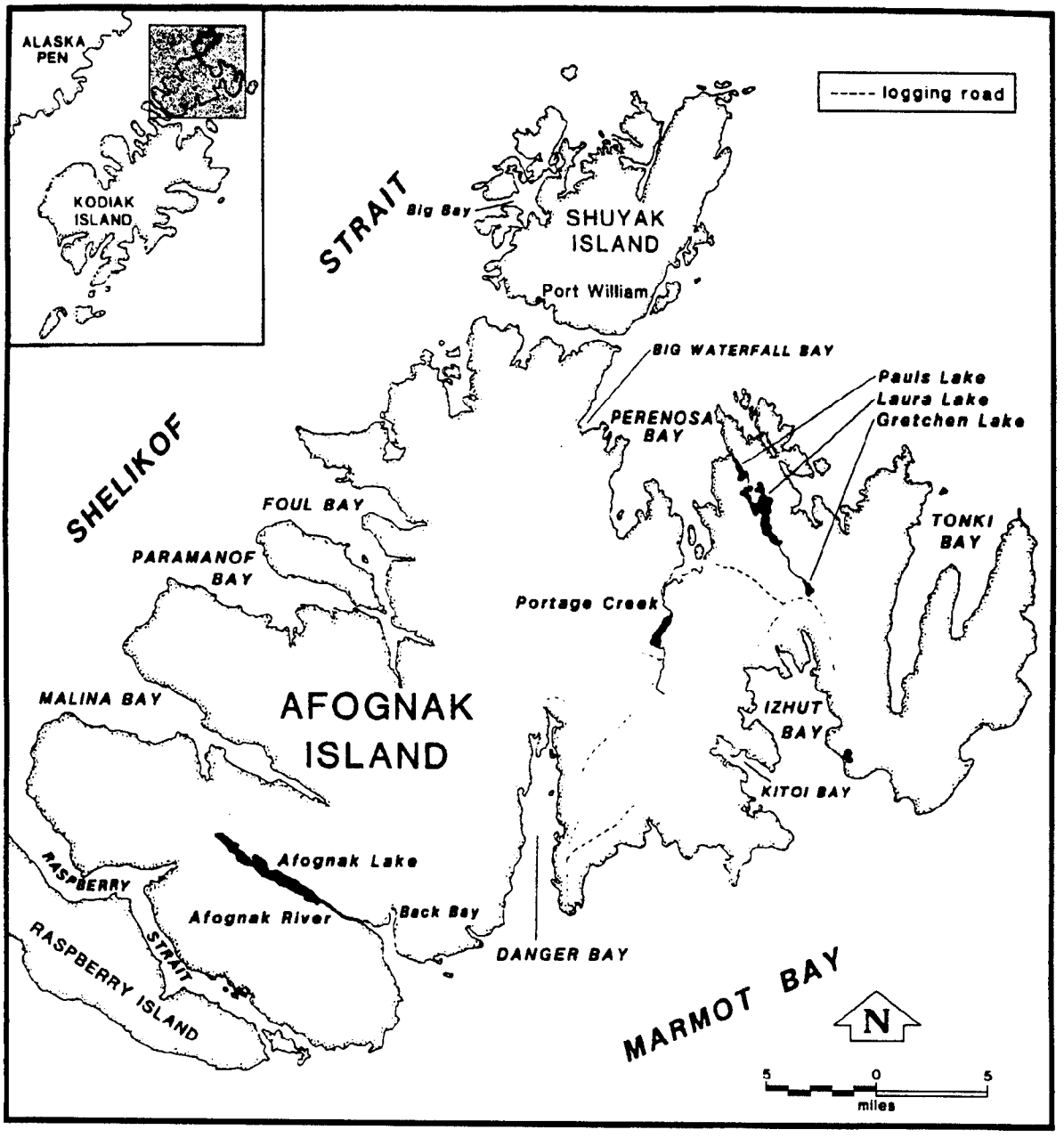

Figure 8.-Afognak/Shuyak islands and surrounding waters.

The marine and fresh waters of the Afognak/Shuyak Island group support the fourth most popular fishery in the KMA in terms of recreational angling effort expended since 1985 (Figure 2). Since 1985, these waters have accounted for nearly 10% of the recreational angling effort expended in the KMA. There are two major fisheries that occur in the waters of the Afognak/Shuyak Island group. These fisheries target coho salmon and halibut. The halibut fishery is discussed under marine bottomfish.

AFOGNAK/SHUYAK ISLAND COHO SALMON FISHERIES

HISTORICAL PERSPECTIVE

Coho salmon return to Afognak/Shuyak Island waters from mid August through mid October. Peak immigration typically occurs during early September, with spawning beginning in October.

In the remote waters of the Kodiak Regulatory Area (including the Afognak/Shuyak Island group), the daily bag and possession limits for salmon (other than chinook salmon) greater than 20 inches has been 5 fish, and for under 20 inches 10 fish. The Alaska Board of Fisheries changed the possession limit for salmon other than chinook from 1 daily bag limit to 2 daily bag limits. This regulation became effective in the 1996 season.

From 1986 through 1995, the waters of the Afognak/Shuyak Island area accounted for an average harvest of 3,360 coho salmon, accounting for an average of 17% of the total KMA coho salmon harvest over this period (Table 24). Nearly all of the harvest has occurred in salt water with the majority occurring in the marine waters off Afognak Island.

A creel survey of selected coho salmon fisheries on Afognak and Shuyak islands was conducted during 1987 (Murray 1988b). Results of this survey conducted at five sites (Table 25) showed that anglers fished an estimated 3,520 angler-hours to harvest an estimated 1,320 coho salmon. In 1987 the Afognak Lagoon coho fishery, which is the largest fishery on Afognak, was not surveyed so the harvest estimate for the surveyed sites cannot be compared to the Statewide Harvest Survey for the entire Afognak/Shuyak area. In 1990 a creel survey was conducted in Afognak Bay and Lagoon and estimated 3,700 angler-hours and harvest an estimated 3,010 coho salmon (Table 25). An estimated 1,106 coho were released (Schwarz and Sonnichsen 1991). The 1990 SWHS estimate for the entire Afognak/Shuyak Island area was 3,096. These two estimates are not comparable because the creel survey estimate is just for a portion of the total Afognak/Shuyak Island area. However, the closeness of the two estimates shows that the SWHS serves as an order-of-magnitude estimator for the Afognak/Shuyak Island coho salmon fisheries.

RECENT FISHERY PERFORMANCE

The sport harvest of coho salmon from Afognak/Shuyak Island waters during 1995 (2,560) was about average (Table 24). This harvest accounted for 17% of the total coho salmon harvest from KMA waters during 1995. In addition to the harvest of 2,560 coho salmon from Afognak/Shuyak Island waters during 1995, an additional 820 coho salmon were estimated to have been caught and released by sport anglers during 1995 (Howe et al. 1996). Based on this, anglers released an estimated 24% of the coho salmon they caught in this area during 1995.

Sport fishing opportunities for coho salmon in the Afognak/Shuyak Island area were good during 1996, especially in Afognak, Pauls Bay, Shuyak Island and Marka Bay. Returning coho were abundant in all these systems. Harvest information for the 1996 season is not available at this

Table 24.-Harvest of coho salmon from Afognak/Shuyak islands waters of the Kodiak Management Area, 1986-1995.

Year	KMA Harvest	Afognak/Shuyak Islands[a] Harvest	% of KMA
1986	20,479	5,091	20
1987	17,355	4,383	23
1988	18,298	3,802	18
1989	20,176	2,718	12
1990	20,065	3,096	15
1991	17,691	3,232	18
1992	16,540	3,652	22
1993	22,889	2,746	12
1994	14,600	2,346	16
1995	15,194	2,563	17
MEAN	18,328	3,363	17

[a] Includes SWHS estimates for saltwater boats Afognak Island area, shoreline Afognak Island area, and individual responses that are listed as Afognak/Shuyak areas but are lumped together with other areas and listed under boat other, shoreline other, other remote streams, and other lakes.

Table 25.-Creel survey statistics for selected sport fisheries for coho salmon on Afognak and Shuyak islands, 1987 and 1990.

Year	Location	Effort (Angler-Days)	Harvest (Number of Fish)	Release
1987	Portage Creek	1,972	589	
	Pauls Bay	729	159	
	Big Bay	427	378	
	Carry Inlet	289	106	
	Shangin Bay	107	92	
	All Sites	3,524	1,324	
1990	Afognak Lagoon	3,700 [a]	3,010	1,016

[a] Angler hours

time. However, the harvest is expected to be similar to 1995 or possibly slightly higher if anglers take advantage of the regulations which increased the possession limit.

MANAGEMENT OBJECTIVES

Management objectives for this fishery are to provide angling opportunities at a level that can be supported by the resource.

Marka Bay on Afognak Island, however, supports a small but popular coho salmon fishery. There have been increasing complaints of crowding and bag limit violations in this fishery. Monitoring this fishery and collecting information on escapement may be warranted if use continues to increase.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are currently no ongoing research or management activities specifically directed at this fishery. Coho salmon escapements into some of the major drainages are monitored with weirs (Afognak Lake, Pauls Lake and Big Bay) (Table 26).

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Based on the creel survey conducted during 1990, it is apparent that the Afognak (Litnik) Lagoon fishery for coho salmon is a major fishery rivaling harvest in the Buskin and Pasagshak rivers sport fisheries. To better monitor the growth of this sport fishery, staff recommends that this location be defined as a specific site in future statewide sport fishing postal survey forms. Sport Fish personnel should also visit Marka and Pauls Bay to become familiar with this fishery.

KARLUK AND AYAKULIK (RED) RIVERS FISHERIES

The Karluk and Ayakulik (also known as Red River) are located on the southwest end of Kodiak Island (Figure 9). Anglers fishing the Karluk River typically gain access to the river in one of three fashions. Anglers fly into the village of Karluk via either float or wheel plane and subsequently fish Karluk Lagoon and the lower Karluk River (Figure 9). Others fly into Karluk Lake and float the Karluk River downstream to the Portage or continue downstream to Karluk Lagoon. Finally, access may be gained by flying into the portage reach of the Karluk River via float plane. Anglers accessing the river in this manner either fish just this reach or float down to the Lagoon. Anglers fishing the Ayakulik River (Figure 9) typically gain access to the fishery by float-equipped aircraft. The major access location on the upper Ayakulik River is at the confluence of the Ayakulik and Bare Creek. The Karluk and Ayakulik rivers support native stocks of steelhead trout and all five species of North American Pacific salmon. Chinook and coho salmon are the preferred salmon species; however, both rivers have large runs of sockeye and pink salmon.

KARLUK AND AYAKULIK RIVERS STEELHEAD TROUT FISHERIES

HISTORICAL PERSPECTIVE

Sixteen river systems on Kodiak and Afognak islands are known to support populations of steelhead trout (Figure 10), of which the Karluk and Ayakulik rivers support the largest populations. Steelhead trout returning to the Karluk and Ayakulik rivers are fall-run fish which

Table 26.-Coho salmon counts at weirs on Afognak and Shuyak islands, 1985-1995.

Year	Afognak		Pauls Bay		Portage Creek		Big Bay[a]		Bear Creek[a]	
	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation	# Coho	Last day of operation
1985	13,847	29-Sep	9,535	12-Sep						
1986	5,082	28-Sep	9,403	3-Sep						
1987	11,469	24-Sep	4,767	11-Sep	3,710	20-Sep			833	23-Sep
1988	9,772	9-Sep	5,563	3-Sep	2,354	4-Sep	1,771	2-Oct	967	6-Sep
1989	13,050	20-Sep	7,919	10-Sep	5,928	28-Aug	1,799	11-Sep	441	7-Sep
1990	13,380	17-Sep	3,668	7-Sep	4,277	8-Sep	1,535	30-Sep	926	15-Sep
1991	14,409	8-Sep	Not operated				2,823	28-Sep	Not operated	
1992	16,415	15-Sep	Not operated				931	18-Sep	925	8-Sep
1993	6,637	12-Sep	10,664	2-Sep			2,281	25-Sep	2,048	6-Sep
1994	11,965	18-Sep	12,538	6-Sep			2,065	26-Sep	Not operated	
1995	9,856	11-Sep	15,491	11-Sep			916	9-Sep		
Average	11,444		8,839		4,061		1,765		1,231	

[a] Big Bay and Bear Creek weirs are located on Shuyak Island.

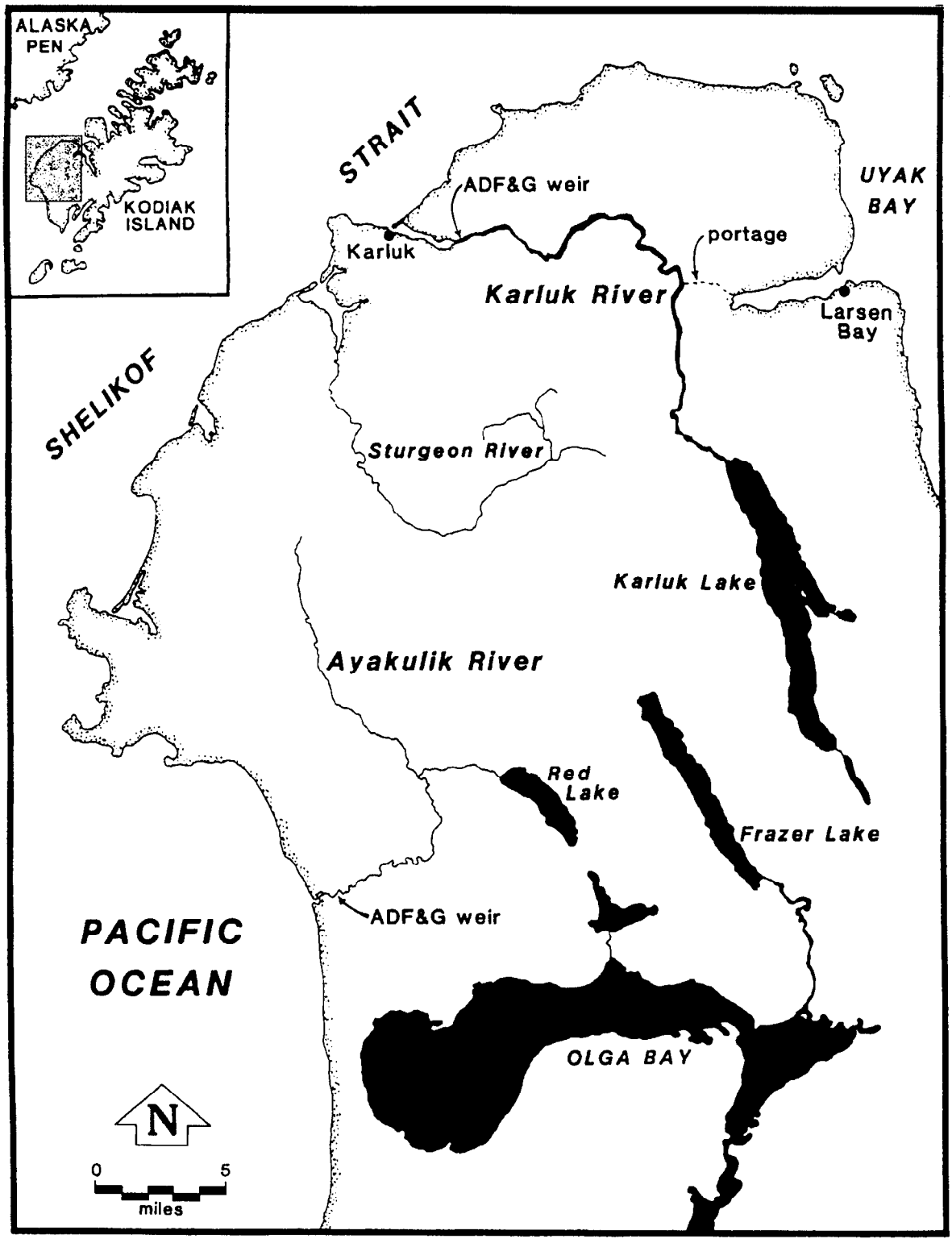

Figure 9.-The Karluk and Ayakulik rivers.

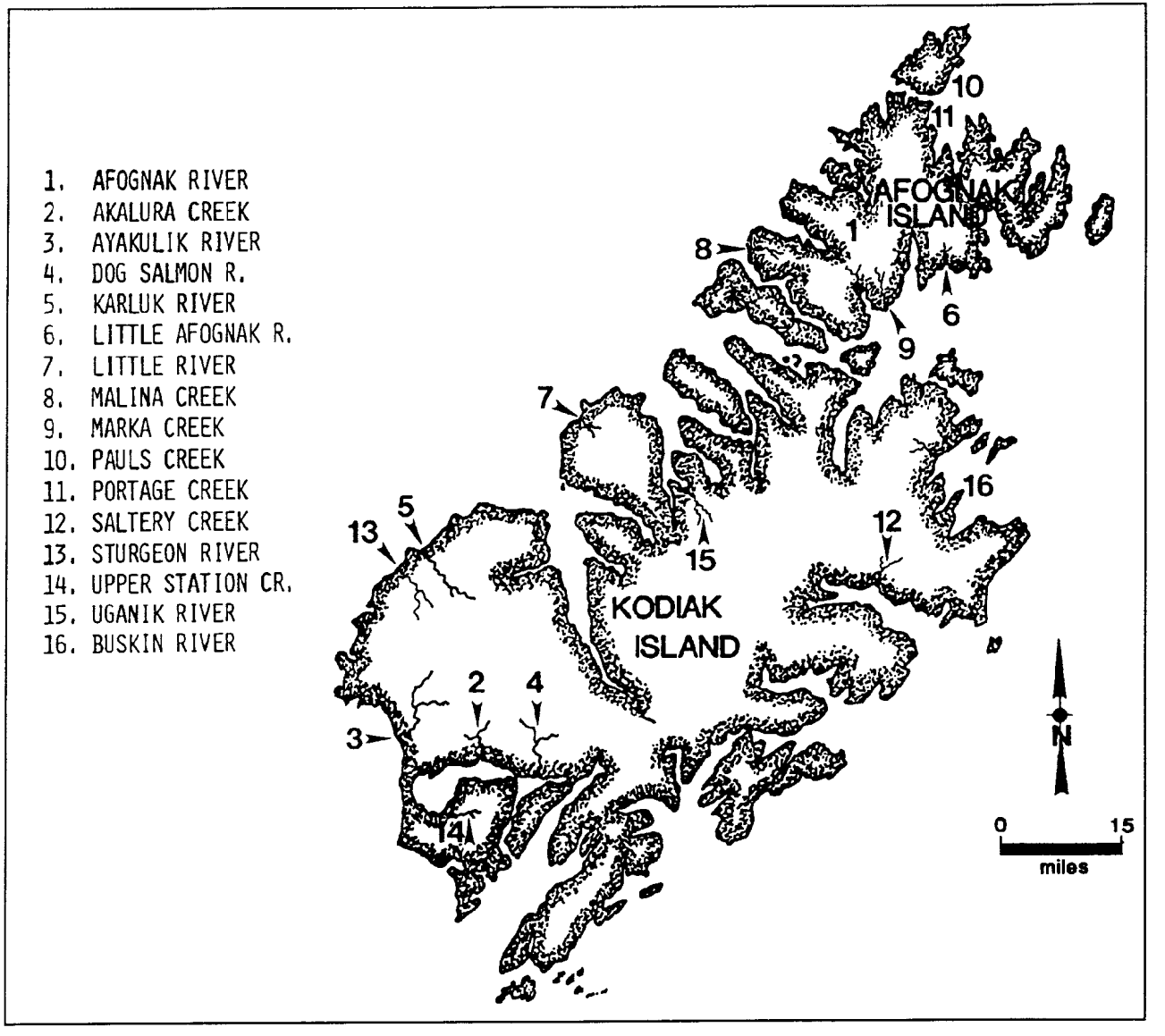

Figure 10.-Locations of steelhead trout stocks on Afognak and Kodiak Island.

begin entering the Lagoon and lower river in mid-August and may continue immigration through the winter months. The peak of the run occurs in late October. The majority of spawning takes place from April through early June.

Daily bag and possession limits for steelhead/rainbow trout in the remote portions of the Kodiak Regulatory Area (which includes the Karluk and Ayakulik rivers) are 2 fish, only 1 of which may be 20 inches or more in length. Fishing for steelhead trout in flowing waters is closed from April 1 through June 14 to protect spawning fish.

From 1986 through 1995, sport anglers have harvested an average of 90 and 60 steelhead trout from Karluk and Ayakulik River drainages, respectively (Table 27). This harvest has accounted for an average of 20% and 12% of the total KMA steelhead trout harvest from KMA waters during this period (Table 27). Of these two rivers, the Karluk River supports the largest fishery. However, effort on the Ayakulik River has increased in recent years. Steelhead trout are incidentally harvested in the commercial salmon fisheries along the Alaska Peninsula and southwest side of Kodiak Island and in the subsistence fisheries conducted by the residents of Karluk and Larsen Bay villages (Begich 1992, 1993, 1995a, 1995b).

The total returns of steelhead trout entering the Karluk and Ayakulik rivers are not known because weirs located on both systems are not operated past September, when the majority of the immigration occurs. However, after overwintering and spawning, surviving postspawn steelhead trout (kelts) emigrate downstream and pass through a weir located near the mouth of both rivers. Mortality associated with spawning is not fully understood, however on the Karluk River from 1992 through 1996 survival of steelhead from prespawn capture to postspawn weir emigration has ranged from 36% to 67% since 1986 (Table 28). Kelt counts on the Karluk River have ranged from 210 to 7,014 (Table 29). A 4-year trend of low kelt counts beginning in 1986 indicated a declining population at the Karluk River. However, in recent years the number of emigrating kelts has increased, with the 1994 and 1995 counts being the highest on record. At the Ayakulik River, kelt counts have been stable averaging 970 fish since 1981 with a 1996 count of 700 fish (Table 29).

RECENT FISHERY PERFORMANCE

According to the Statewide Harvest Survey (Howe et al. 1996), the sport harvest of steelhead trout from the Karluk River drainage in 1995 was 50 fish with 1,040 fish released (Table 27). Effort and catch data were also obtained from a creel census conducted at the Karluk River Portage from October 1 through November 10, 1995. A total of 25 steelhead were harvested, and 2,939 were released. These figures represent data from anglers interviewed at the Portage and the outfitter's camp, as well as information from 14 rafters who rafted the river and exited at the lagoon. A total of 612 angler-days of fishing effort occurred. Although these figures represent a large percentage of the total fall fishery, they still represent minimum estimates of harvest and effort because steelhead caught in the lagoon during August, September and October are not accounted for. The Statewide Harvest Survey estimated that no steelhead were harvested and 511 released during 1995 in the Ayakulik River (Table 30). The steelhead harvest from these two rivers represented 50% of the harvest in the entire KMA during 1995.

Steelhead trout fisheries on the Karluk and Ayakulik rivers are primarily catch and release fisheries. Since 1991, approximately 97% of all steelhead trout caught on both rivers were

Table 27.-Harvest of steelhead trout from the Karluk and Ayakulik (Red) River drainages, 1986-1995.

Year	Karluk River		Red River		Total KRA[a]
	Harvest	# Released	Harvest	# Released	Harvest
1986	70		0		321
1987	90		0		253
1988	109		91		853
1989	30		279		778
1990	86	1,053	17		1,120
1991	148	961	96	228	327
1992	40	898	16	418	96
1993	189	3,446	0	2,000	433
1994	80[b]	1,387	46	869	234
1995	47	1,040	0	511	94
MEAN	89	1,464	55	805	451

Note: Reported catches of rainbow trout from the Ayakulik and Karluk drainages are treated as steelhead. The rainbow trout populations in these drainages are so small, relative to the steelhead populations, that reported rainbows are probably misidentified steelhead.

[a] This harvest estimate is calculated by adding the steelhead reported in the Statewide Harvest Survey under Saltwater total, Karluk, Ayakulik, Saltery, Other streams and other lakes. Rainbow trout reported in the Karluk and Ayakulik Rivers are also counted as steelhead. Steelhead reported under roadside lakes are considered as rainbow trout.

[b] In 1994 a creel census occurred on the Karluk River during the chinook and steelhead return in June. A total of 5 steelhead were harvested and 268 released during the June chinook fishery.

Table 28.-Karluk River steelhead spawning population research summary, 1992-1996.

Year	Spawning Population Size	Sex Composition		# Initial Spawners	# Repeat Spawners	# Multirepeat Spawners	Spawning Survival	Previous year's fall weir count[a]
		Male	Female					
1992	4,107 (± 263)			3.203	739	165	2,752 (67%)	339 (1991)
1993	7,026 (± 604)	2,339(±302)	4,687(±461)	6,113	843	70	4,075 (58%)	356 (1992)
1994	9,116(± ,023)	4,928(±680)	4,188(±629)	7,.384	1,641	91	4,649 (51%)	852 (1993)
1995	10,801(± 857)	4,174(±641)	6,629(±760)	8,965	1,620	217	6,697 (62%)	1,145 (1994)
1996	7,252(± ,321)	4,070(±896)	3,182(±768)	5,972	1,109	171	2,605 (36%)	1,535 (1995)

[a] This number is the weir count as of September 23. During most years the weir is operated up to this date, and selecting a common date for each year allows a better comparison than comparing the end of the season count.

Table 29.-Counts of steelhead trout kelts from the Karluk and Ayakulik (Red) River drainages, 1981-1996.

Year	Karluk River	Ayakulik River
1981	2,194	1,108
1982	1,096	54
1983	4,203	1,351
1984	2,512	1,306
1985	1,924	693
1986	296	1,016
1987	687	727
1988	210	918
1989	611	789
1990	1,029	970
1991	1,475	910
1992	2,862	1,174
1993	4,259	1,517
1994	4,910	1,150
1995	7,014	1,134
1996	2,749	701
MEAN	2,377	970

Table 30.-Statewide steelhead catches by river in order of magnitude (1993, 1994 ,1995).

Stream	1995[a] Harvest	1995[a] Release	1994 Harvest	1994 Release	1993 Harvest	1993 Release	(All Years) Total Catch	1990-1995 Estimated Spawning Population Range	Population Characteristics	Management Approach
Kasilof[b]	692	3,143	1,262	4,894	2,237	5,280	17,508	Average returns to weir at hatchery=415	Small fall run. Enhancement terminated 1995. Run will decline	Open all year, 2 fish per day, 2 in possession. Only 1 over 20".
Situk	48	3,996	42	3,186	0	4,321	11,593	8,000 - 11,000	Fall and Spring run. Spring run is larger.	Unbaited artificial lures only 36" minimum size limit. 1 fish per day, 2 per season
Anchor	0	1,654	0	3,388	0	3,321	8,363	800 - 2,000	Fall run	Catch and Release Only unbaited artificial lures 9/1-12/31
Karluk	47	1,040	80	1,387	189	3,446	6,189	3,000 - 11,000	Fall run Fish overwinter in rivers.	2 fish per day, only 1 over 20". Spawning Closure 4/1 - 6/14
Ayakulik	0	511	46	869	0	2,000	3,426	1,500 - 3,000	Fall run Fish overwinter in rivers	2 fish per day, only 1 over 20" Spawning Closure 4/1 - 6/14
Deep Cr	0	321	0	904	0	1,234	2,459	200 - 300	Fall run	Catch and Release Only unbaited artificial lures 9/1-12/31
Petersburg Cr.	17	747	108	547	49	304	1,772	300 - 500	Spring run	1 fish daily, 2 in possession 36" minimum size limit
Sitkah			0	403	19	854	1,276	500 - 1,500	Fall and Spring run Fall run is very small	1 fish per day must be over 36"
Ninilchik	0	120	0	660	0	386	1,166	No estimate available	Fall enhancement very small. Fall run. Targeted Fall fishery	Catch and Release Only unbaited artificial lures 9/1-12/31
Wards Cove	0	77	23	513	50	450	1,113	300 - 500	Fall and Spring runs Hatchery enhanced/Klawock	Wild: 1 fish per day, 2 per season 36" minimum size limit, single hook Hatchery: 2 fish per day
Buskin R	0	149	9	533	0	404	1,095	500 - 1,000	Fall run Fish overwinter in Buskin Lake	Closed 1970-1995. Starting 1996, Nov & Dec , Catch and Release unbaited, artificial lures only
Karta	30	253	0	658	10	115	1,066	800 - 1,200	Fall and Spring run Fall run is very small	1 fish daily, 2 in possession 36" minimum size limit
Staney Cr	0	0	0	554	0	359	913	300 - 500	Fall and Spring run Spring run is larger	Same as Ward Cove No single hook restrictions.
Thorne	10	113	0	608	9	145	885	500 - 1,000	Fall and Spring run Spring run is larger	Same as Ward Cove No single hook restriction.
Ketchikan	17	74	0	347	0	329	767	300	Fall and Spring runs Hatchery enhanced, Deer Mtn	Same as Ward Cove, single hook restriction 9/15 - 5/15
Klawock R[b]	42	74	75	194	0	360	745	500 - 1,000	Fall and Spring run Klawock hatchery PNP	Same as Ward Cove No single hook restrictions
Naha	0	75	15	243	0	367	700	500	Fall and Spring run Fall run is dominant	Same as Ward Cove No single hook restrictions

[a] Data from Statewide Harvest Survey

[b] Hatchery enhanced

released. The current bag and possession limit for steelhead trout over 20 inches is one fish. This regulation, coupled with the remote location of the rivers and a lack of public facilities for freezing fish, dictates a low retention rate. The Karluk and Ayakulik rivers currently have the potential to generate some of the highest steelhead catches in the state of Alaska. These two rivers generated the fourth and fifth largest number of fish caught in the state when considering the 1993-1995 fishing years (Table 30, Figure 11). Future trends in sport catch and effort will depend upon maintenance of current steelhead abundance levels, public access, and public awareness of the quality of these steelhead trout fisheries. The Karluk and Ayakulik steelhead fisheries are marked examples of level III fisheries, with high costs of participation and low yield in terms of harvested fish. Continued growth will be dependent on the willingness of anglers to bear the high costs of access, poor weather conditions and limited public facilities. Without additional growth these fisheries will still provide diversity in the KMA, offering anglers an uncrowded, remote experience with excellent fishing for steelhead trout.

Effort and catch estimates for 1996 are not available from the Statewide Harvest Survey at this time, and the creel survey which was conducted at the Karluk Portage in 1994 and 1995 was not repeated in 1996. However, reports from anglers who fished the Karluk in October indicated that catches were good. The 1996 Karluk weir operation which ended on September 25 with a steelhead count of 1,660 also indicates a strong return.

MANAGEMENT OBJECTIVE

Specific fishery objectives have not been formally established for Karluk and Ayakulik steelhead trout fisheries to date. An assumption of past and current fisheries management, however, has been to follow the guidelines set forth in the Cook Inlet and Copper River Basin Rainbow and Steelhead Trout Management Policy for wild stocks of steelhead trout (ADF&G 1986). This policy provides future Fisheries Boards, staff managers, and the sport fishing public with:

1. Management policies and implementation directives for area rainbow and steelhead trout fisheries;
2. A systematic approach for developing sport fishing regulations that includes a process for rational selection of waters for such special management as catch and release, trophy areas, and high yield fisheries; and
3. Recommended research objectives.

A primary research objective is to establish a relationship between spawning population size and spring kelt counts. Once this relationship is established, monitoring the size of the spawning population will be possible through examining kelt counts.

RECENT BOARD OF FISHERIES ACTIONS

During the December 1995 Board of Fisheries meeting in Kodiak, the Board rejected a public proposal that would have prohibited the use of bait in fresh water of the Kodiak remote zone. The department's position on this proposal was that it was too broad and applied to too many species. The department stated that although we were opposed to the proposal, we were not opposed to prohibiting the use of bait in specific streams for specific species as identified through a planning process used to develop special use areas. Steelhead stocks on Kodiak Island are the most likely species to which special use plans would be applied. The department will

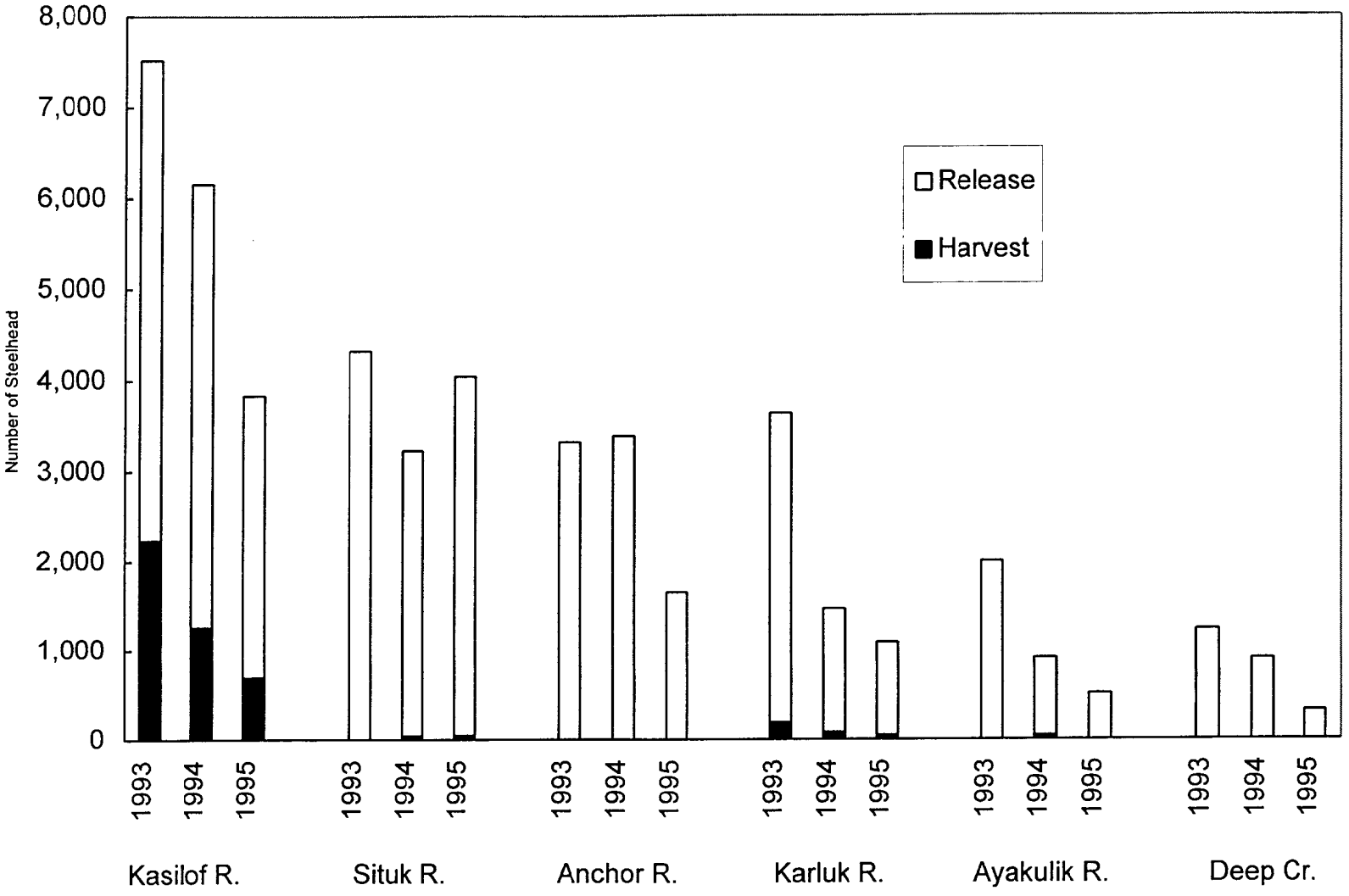

Figure 11.-Sport-caught steelhead catches from Alaskan rivers reporting the highest catches during 1993-1995.

work with anglers who are interested in developing special use areas, following the guidelines used in the Cook Inlet and Copper River Basin Rainbow and Steelhead Trout Management Policy for wild stocks of steelhead trout.

CURRENT ISSUES

Kelt counts declined in the late 1980s on the Karluk River (Table 29). In response to this decline, the Division of Sport Fish initiated a research project on the Karluk River. The abundance of steelhead, as indicated by kelt counts, began to increase in 1990, and the 1995 count of 7,014 in 1996 was the highest on record. This rebound in steelhead trout abundance makes additional sport fishery restrictions for stock preservation unnecessary at this time.

Annual subsistence harvest by residents of Larsen Bay village has averaged 336 steelhead trout since 1991 (Begich 1995b). This is a rod and reel fishery which occurs during the winter and spring months. State regulations do not designate rod and reel as a legal subsistence gear type for subsistence fishing on Kodiak Island. Federal regulations do allow rod and reel as a legal subsistence gear type but disallow the taking of steelhead as a subsistence species on Kodiak Island. This places the current subsistence fishery in violation of both state and federal regulations. The harvesting of steelhead from the Karluk River is legally limited by sport fishing regulations to a season of June 15 to March 31, and the daily bag limit is 2 steelhead trout of which only one may be over 20 inches in length. It has been documented through departmental surveys that the subsistence fishery has existed for several years, takes place during April, and that residents often exceed daily bag and possession limits. Larson Bay city offices have been notified that the fishery is illegal and the process available to make it a legal fishery could be initiated if they desire. State regulations do allow for the retention of incidentally caught steelhead in legal subsistence net fisheries.

Maintaining effective kelt emigration through salmon counting weirs is an important component of maintaining an abundant population. Repeat and multi-repeat spawners add significantly to future years' fishery and spawning population (Table 30). In addition, repeat spawners are larger fish (Begich 1995a and 1995b) which are a desirable component of the sport fishery. Delayed downstream passage of kelts due to weirs results in increased mortality to kelts. Downriver passages or traps have proven effective, and aluminum traps have been built and incorporated into the weirs on the Karluk since 1992 and on the Ayakulik since 1993. These traps provide an opening in the weir for fish moving downstream. Once the steelhead enter the trap they can be sampled and released downstream. Construction and installation of a weir trap for the Dog Salmon River is planned for 1997.

There is a large concern regarding maintenance of adequate angler access to these recreational fisheries as native landowners and the Kodiak National Wildlife Refuge develop their land management strategies.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Since 1991, the Division of Sport Fish has conducted a comprehensive research project on the Karluk River steelhead population. This study has investigated the magnitude of the incidental commercial harvest of steelhead from marine waters near the Karluk River. The study estimated sport harvest, documented subsistence harvest and estimated the number of spawning adult steelhead in the Karluk for the 1992 through 1996 spring spawning populations. In 1994 and 1995 the study was expanded to include an onsite autumn angler survey. The complete results of

the first 5 years of study are presented in Begich (1992, 1993, 1995a, 1995b, 1997). A summary of the important findings is presented below.

From August 15 through September 30, commercial purse seine and set gill net catches from selected waters along the southwest portion of Kodiak Island were sampled for the bycatch of steelhead trout. The total estimated catch of steelhead trout in these fisheries ranged from 41 to 705 from 1991 to 1994 (Table 31).

All kelts emigrating through the weir since 1992 have been tagged. Therefore, any repeat spawner caught in the commercial fishery of Karluk origin would have a tag in it. It was hoped that the contribution of Karluk stocks to the incidental commercial mixed-stock harvest could be estimated by determining the percentage of tagged fish observed. However, insufficient numbers of tagged fish were recovered to estimate the Karluk River contribution. It is probable that the steelhead catch is comprised of mixed stocks due to the proximity of other steelhead systems to the Karluk (Figure 10).

Sport harvests of steelhead on the Karluk are low. Approximately 97% of all steelhead caught since 1990 have been released. Angler participation in the Karluk River fishery is increasing, and the number of fish caught has increased from about 1,140 fish per year in 1990 to a record 3,640 steelhead trout in 1993 (Table 27). After 1993, it was apparent that reports of good steelhead fishing on the Karluk River were circulating among anglers. In anticipation of increased angling effort during the 1994 season, a department tent camp was established on the Karluk Portage so that the fishery could be monitored. From October 4 through November 11, 1994, 585 angler-days were expended to harvest 25 steelhead with 2,942 released. Five steelhead were caught per angler-day. Additionally, 12 coho salmon were harvested with 273 released, 34 Dolly Varden harvested with 2,603 released and 5 sockeye salmon harvested with 162 released.

The creel survey at Karluk Portage was repeated in 1995. From October 1 to November 10 a total of 32 steelhead were harvested, and 2,466 were released. These figures represent information collected from anglers exiting the river from the Portage, the outfitter's camp and 14 anglers who rafted the river, exiting at the lagoon. A total of 612 angler-days of fishing effort was expended. The average catch rate was four steelhead per angler day.

The fall creel census does not consider the June catch of steelhead kelts which occurs incidentally during the chinook salmon fishery. In 1994 a creel census for chinook salmon was conducted at the Karluk Portage and weir. During the chinook salmon census anglers were also asked if they caught any steelhead. A harvest of five steelhead with 268 fish released was documented, indicating that steelhead kelts caught in June make up a very small portion of the total steelhead catch. Steelhead catches reported in the Statewide Harvest Survey are largely comprised of steelhead taken in the directed fall fishery.

The 1994 total documented harvest was 30 steelhead with 3,210 fish released. The total was arrived at by adding the creel censuses that were conducted during the summer chinook fishery and fall steelhead fishery. Although this harvest represents most of the actual catch it is considered a minimum estimate. It does not account for catches that were made in Karluk

Table 31.-Incidental commercial and subsistence harvests of steelhead, Larsen Bay and Karluk Village, 1991-1994.

Year	Incidental harvest of Steelhead in Commercial Salmon Fishery[a]	Larsen Bay Subsistence Harvest[b]	Karluk Village Subsistence Harvest[b]
1991	705	263	47
1992	417	697	107
1993	41	382	0
1994	293	0	35

[a] Includes steelhead retained for personal use as recorded on catch calendars. Does not include steelhead that were released live from commercial gill nets.

[b] These are estimates calculated by multiplying the average number of steelhead harvested/household by the total number of households in the village.

Lagoon. This documented catch compares with an estimate from the statewide harvest survey of 80 steelhead harvested with 1,387 released.

The 1995 fall census documented a harvest of 32 steelhead with 2,466 released. The Statewide Harvest Survey estimates 47 steelhead harvested and 1,040 released. The 1994 and 1995 Statewide Harvest Survey estimated less than 50% of the catch that was documented during the fall creel surveys. The Statewide Harvest Survey draws its sample from anglers who purchased licenses between January 1 and September 30. This is done to ensure timely analysis of survey returns. Generally this is not an issue because most fishing occurs during summer months. However, the steelhead fishery is an exception because the main fishery occurs in October. Anglers who purchased licenses in the spring and fish for steelhead in October are included in the pool of anglers who could be sent questionnaires about their fishing activity and catch. However, anglers who buy their licenses in October or November are not included in the pool of anglers who can potentially be sampled. This is especially true for nonresidents who fish in October and November because they are not likely to purchase their licenses until they enter the state. Nonresidents account for most of the effort (70%) and catch (80%) in this fishery, based on creel census information. Because of this methodology, the Statewide Harvest Survey underestimated the steelhead catch in the Karluk River by more than a factor of 2 in 1994 and 1995.

The subsistence steelhead harvest in 1994 was zero from Larsen Bay and 35 from Karluk Village (Table 31, Begich 1995b). Harvests have averaged 336 from Larsen Bay and 47 from Karluk Village since 1991. The estimated abundance of steelhead spawning in the Karluk River during the spring of 1996 was 7,252 (Table 28, Begich 1995b). The majority of the population has been comprised of initial spawners, ranging from 78% to 87% and averaging 82% since 1992. Repeat spawners have accounted for less than 20% of the population, ranging from 12% to 18% and averaging 18% since 1992. Sampling at the Ayakulik began in 1993. The Ayakulik kelt emigration has averaged 27% initial spawners (74%, 66%, 64% and 82% initial spawners in 1993, 1994, 1995, and 1996, respectively).

Spawning survival in the Karluk has ranged from 36% to 67% and averaged 55% between 1992 and 1996. The spawning survival was 36% in 1996 (Table 28, Begich 1995b).

The Karluk steelhead population had fish present from 15 age groups. In 1996 the dominant age groups for spawning population were age 2.3, 2.2 and 2.3s2[2]. These age groups made up 41%, 34% and 10% of the population, respectively. The kelts sampled at the weir also had 2.3, 2.2 and 2.3s2 as the dominant age groups, making up 63%, 28% and 80% of the population, respectively. The Ayakulik kelt population in 1996 was dominated by age groups 2.3, 2.2 and 2.3s2 making up 50%, 25% and 8% of the population, respectively.

[2] The "s" in the age designation indicates that the fish spawned. This is evident by the presence of a spawning check which occurs when the fish partially reabsorbs some of its scale during spawning. After spawning the fish may survive and return to sea. After a period at sea, the fish will return again to spawn and will be termed a repeat spawner. So, for example, the fish that was designated a 2.3s2 age was a fish that spent 2 years in fresh water, spent 3 years in salt water, returned to the river and spawned, returned to sea for 2 years, returned to the river and was sampled shortly before spawning again. This fish was about to become a repeat spawner after it had spawned the second time.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Field work in the research program initiated during 1991 is scheduled to continue until July of 1997. A graduate intern position was created in January 1996, and Karluk steelhead is the focus of the graduate program. The graduate program is expected to be completed in June 1998.

The sixth mark-and-recapture experiment designed to estimate the abundance of the spawning population at the Karluk River will occur in the spring of 1997. Results will help define spawning survival, age class composition, and verification of scale age determined from tag recoveries and spawner abundance. Establishing the relationship between the number of spawning fish to the number of kelts will make it possible to monitor the spawning population size via kelt counts at the weir.

The incidental harvest of steelhead in the commercial and subsistence fisheries should be discontinued. The sport fishery will be monitored through the Statewide Harvest Survey and no longer monitored by a creel census.

A possible source of mortality for steelhead trout of Karluk origin, which has not been investigated, is the June commercial salmon fishery. During this time, abundance of steelhead is high in nearshore fisheries within close proximity to the Karluk River. These are the kelts which have survived to emigrate back to the sea. Monitoring of this fishery would be difficult and costly. Generally kelts are easily identified in commercial catches and immediately removed from the catch. Therefore, samplers would need to be stationed on vessels when the catch is landed. The mobile purse seine fleet in Kodiak waters numbers some 391 vessels, and monitoring the incidental kelt catch in selected areas would be difficult. Because of the difficulty involved with monitoring the June commercial salmon fishery, attempting to document the incidental steelhead harvest is not recommended.

A method to improve the way the Statewide Harvest Survey estimates the Kodiak steelhead harvest should be investigated.

KARLUK AND AYAKULIK RIVERS CHINOOK SALMON FISHERIES

HISTORICAL PERSPECTIVE

The Karluk and Ayakulik rivers support the only populations of native chinook salmon in the Kodiak Regulatory Area. Chinook salmon return to the Karluk and Ayakulik rivers from late May through mid-July, with 50% of the immigration usually passing weirs located in the lower rivers by June 15. Chinook salmon in the Karluk River spawn from the outlet of Karluk Lake downstream to just above the Lagoon. Few, if any, chinook salmon enter Karluk Lake or its tributaries. Spawning occurs from mid-August through mid-September. The distribution of spawning chinook salmon in the Ayakulik River begins just above tide water and extends upriver. One of the major spawning tributaries is a fork on the Ayakulik just upriver from the Red River. Few fish, if any, enter Red Lake. Spawning occurs from late July through late August. Anglers generally fish for chinook salmon on the Ayakulik River below the Red River confluence. Anglers often mistakenly call the Ayakulik the “Red River.” Fishing for chinook salmon is open year-round throughout both the Karluk and Ayakulik rivers. The bag and possession limits are 3 chinook salmon, only 2 of which may be over 28 inches. In addition, there is a provision which allows the harvest of 10 chinook salmon under 20 inches in length.

The Statewide Sport Fish Harvest Survey provides estimates of harvest for the recreational fisheries in these waters. Complete or partial creel surveys were conducted in both rivers from 1993 through 1996. Chinook salmon bound for both the Karluk and Ayakulik rivers are also harvested in commercial and subsistence fisheries.

The estimated annual sport harvest of chinook salmon from the Karluk and Ayakulik rivers from 1983 through 1995 has averaged 780 and 430 fish, respectively (Table 32). The largest estimated chinook salmon harvest was 1,630 in the Karluk River and 1,000 in the Ayakulik River, both made in 1993.

Escapement of chinook salmon into the Karluk and Ayakulik rivers is enumerated through weirs located near the terminus of each river. Escapement of chinook salmon into the Karluk River has averaged approximately 10,180 fish during the past 16 years (1981-1996), with individual year's totals ranging from 4,430 in 1986 to 14,440 in 1991 (Table 33). In the Ayakulik River, escapement of chinook salmon has averaged approximately 11,160 fish during the same period with individual year's totals ranging from 3,320 to 21,370 (Table 33). Based on these escapements, the exploitation rate of the inriver sport fishery has been low, averaging 7% in the Karluk River and 5% in the Ayakulik River.

RECENT FISHERY PERFORMANCE

Harvest of chinook salmon in 1995 from the Karluk and Ayakulik rivers was estimated through the Statewide Harvest Survey at 1,280 and 200 fish, respectively. Additionally, 2,610 fish were released in the Karluk and 880 in the Ayakulik River (Table 32). These harvests were about double the 1983-1995 average in the Karluk, and the lowest estimated harvest since 1987 on the Ayakulik.

Harvest figures for the 1996 season are not yet available from the SWHS, however, all anglers rafting through the Karluk weir were interviewed for catch and effort information. A total of 330 anglers fished for 1,730 angler-days. They harvested 410 and released 3,000 chinook salmon (Table 34). The success of the 1996 rafters compared with past years appears to be similar to 1995. Harvest levels and the number of anglers in 1996 was about 10% less than 1995.

On the Ayakulik River anglers rafting through the weir, lodge clients, and anglers fishing in the lagoon were interviewed for catch and effort information. In 1996 a total of 140 anglers fished for 450 angler-days. They harvested 290 chinook salmon and released 1,300 (Table 34). The total harvest from anglers interviewed at the weir dropped from over 400 in 1993 and 1994 to 290 in 1996. Shortly after the 1996 fishery began there were no planes available that could pick up rafters at the beach at the conclusion of their trips. This resulted in the lowest number of angler days recorded at the weir as well as the lowest number of released fish. Anglers who raft the rivers usually spend 3 to 4 days fishing and tend to release many fish. Instead of rafting the river and getting picked up at the beach, some anglers rafted downriver several miles and then walked upriver to get picked up at their drop-off site (Bare Creek). As a result of this the weir index may be lower than normal, but anglers exiting at Bare Creek may be higher than normal.

MANAGEMENT OBJECTIVES

The primary management objective is to insure that escapement goals are met in both rivers. Management objectives also include providing angling opportunities at a level that can be

Table 32.-Harvest of chinook salmon from the Karluk and Ayakulik (Red) River drainages, 1983-1995.

	Karluk River			Ayakulik River		
Year	Harvest	Number Released	% of KMA Harvest	Harvest	Number Released	% of KMA Harvest
1983	304		24	145		11
1984	187		16	437		37
1985	472		42	76		7
1986	122		15	76		9
1987	199		20	126		13
1988	819		38	600		28
1989	559		25	390		18
1990	700	2,262	61	252	2,394	22
1991	1,599	3,119	58	563	2,191	20
1992	856	2,754	39	776	3,199	35
1993[a]	1,634	6,734	31	1,004	4,422	19
1994[b]	1,483	2,174	45	948	1,029	29
1995	1,284	2,613	45	200	883	7
MEAN	781	3,276	36	427	2,351	21

Note: Data in this table are from the Statewide Harvest Survey (Mills 1984-1994, Howe et al. 1995 and 1996) unless otherwise indicated.

[a] A creel census at the Karluk weir and spit, and a creel survey of Karluk Lagoon estimated the harvest and release at 569 and 2,566 respectively. This was an incomplete estimate because it did not account for fishing which was conducted at the Portage.

A complete creel census was conducted on the Ayakulik River in 1993 by USFWS. Harvest and catch were documented at 808 and 2,878 chinook salmon, respectively (Schwarz 1996).

[b] In 1994 a creel census occurred above the Karluk weir documenting a harvest of 896 chinook. A creel census in the Ayakulik River documented a harvest of 739 chinook. These estimates were not used to calculate the mean in Table 32.

Table 33.-Escapement and sport harvest of chinook salmon in the Karluk and Ayakulik (Red) River drainages, 1981-1996.

Year	Escapement	Effort[a] (angler-days)	Sport Harvest[b]	Inriver Exploitation Percent
KARLUK RIVER				
1981	7,575			
1982	7,489	1,552		
1983	11,746	2,142	304	3
1984	7,747	820	187	2
1985	5,362	2,520	472	9
1986	4,429	--	122	3
1987	7,930	--	199	3
1988	13,337	2,128	819	6
1989	10,484	2,420	559	5
1990	14,442	2,969	700	5
1991	14,022	4,547	1,599	11
1992	9,601	5,430	856	9
1993	13,944	6,894	1,634	12
1994	12,049	10,948	1,483	12
1995	12,657	6,928	1,284	13
1996	10,151	--	--	--
MEAN	10,179	3,914	786	7
AYAKULIK RIVER				
1981	8,018			
1982	3,320			
1983	15,511		145	1
1984	6,502		437	7
1985	8,151		76	1
1986	6,371		76	1
1987	15,636		126	1
1988	21,370		600	3
1989	15,432		390	3
1990	11,251		252	2
1991	12,988	1,780	563	4
1992	9,135	3,340	776	8
1993	7,819	4,566	1,004	13
1994	9,138	5,473	948	10
1995	17,701	1,299	200	7
1996	10,344	--	--	--
MEAN	11,162	3,292	430	5

[a] This figure represents estimated effort for all species on that river; however, the primary fishery is for chinook.

[b] From Statewide Harvest Survey (Mills 1982-1994, Howe et al. 1995 and 1996).

Table 34.-Comparison of angler chinook catch and effort information obtained at weir sites with total river estimates obtained through the Statewide Harvest Survey and creel surveys, Karluk and Ayakulik rivers.

KARLUK[a]

	SWHS		Creel Survey		Interviewed at Weir			
Year	Harvest	Release	Harvest	Release	Number of Anglers	Angler-days	Harvest	Release
1991	1,599	3,119			162	Not available		
1992	856	2,754			235	807	340	840
1993	1,634	6,734	569[b]	2,566	244	1,088	369	2,484
1994	1,483	2,174	896	4,339	506	1,650	493	3,385
1995	1,289	2,613			380	1,677	492	2,411
1996					329	1,727	406	2,996

AYAKULIK[c]

	SWHS		Creel Survey		Interviewed at Weir			
Year	Harvest	Release	Harvest	Release	Number of Anglers[d]	Angler-days	Harvest	Release
1993	1,004	4,422	808	2,878	150	598	433	1,961
1994	948	1,020	739	2,752	203	926	477	1,898
1995	200	883			126	606	296	2,445
1996					135	446	292	1,299

[a] Steelhead catches for rafting anglers were 69, 127 and 209 in 1992, 1993, and 1994, respectively.

[b] Incomplete survey. Karluk portage not surveyed.

[c] Steelhead catches for the entire Ayakulik River during the chinook salmon fishery were 292 and 400 in 1993 and 1994, respectively.

[d] Includes rafters passing through the weir, lodge clients and anglers fishing in the lower river and exiting from the beach area.

supported by the resource. Maintaining public access is an important objective. Department staff should participate with the federal government and private landowners as they develop their land use plans.

RECENT BOARD OF FISHERIES ACTIONS

Two public proposals were considered by the Board of Fisheries at its December 1995 meeting that would have affected the chinook salmon fisheries in the Karluk and Ayakulik rivers. One proposal would have lowered the bag and possession limit for chinook salmon in fresh waters of the remote zone from 3 fish to 1 fish. The other proposal would have prohibited the use of bait in fresh waters of the remote zone. Neither of these proposals were adopted by the Board because the large returns of chinook salmon experienced in recent years made reducing the efficiency or harvest of the sport fishery unnecessary for conservation purposes.

CURRENT ISSUES

Sport harvest has been a minor component of the chinook salmon harvest (Table 33). Exploitation of the inriver escapement has averaged 7% on the Karluk and 5% on the Ayakulik. These rates have been increasing in recent years and were 12% and 13% on the Karluk and Ayakulik, respectively, in 1993. On the Ayakulik River in 1994, the USFWS documented harvest of 739 chinook salmon during a year when the weir count of chinook salmon was below average (9,138). After the sport harvest is subtracted and an estimate is made for hook-and-release mortality (7%[3] of 2,752), the spawning escapement was 8,206. The spawning escapement was only 1,708 fish above the minimum escapement level of 6,500 for the Ayakulik. There was no commercial fishery in the Ayakulik section in 1994, however the commercial fishery directly in front of the Ayakulik river mouth (subdistricts 256-25, 20, 10) has averaged a harvest of 4,668 chinook salmon since 1990. The smallest harvest occurred in 1995 when 2,477 chinook salmon were harvested (Motis *In prep a*). Had a commercial fishery occurred in 1994, it is likely that minimum escapement objectives would not have been met unless the sport fishery was restricted. If sport fishing harvest increases, the sport fishery will have a larger influence on the overall exploitation of the chinook salmon return. This is especially true during small return years as demonstrated during 1993, when the Ayakulik River fishery had a record harvest and catch occur, but the minimum spawning objective was only exceeded by 30 fish. An emergency order restricting the chinook salmon sport fishery has never been issued for the Ayakulik River or the Karluk River. However, restrictions may become necessary to achieve minimum spawning escapement levels during years of poor returns.

The division will be monitoring escapement levels through weir counts to ensure minimum escapements are met. As chinook salmon returns receive more harvest from the commercial and sport fisheries, it is essential that escapement goals are established that will produce optimum returns and harvests. It appears that the current goals (Karluk 4,500-8,000, Ayakulik 6,500-10,000) are working well, as escapements within these ranges have generated excellent returns. In order to refine these goals, the spawning escapement in both rivers is being sampled for age, length and sex data. This will allow the construction of brood tables and evaluation of returns from varying escapement levels.

[3] Bendock 1991.

Another issue is public access to these rivers. The Karluk River is almost entirely owned by various native corporations. Access to fishing along the Karluk River will remain an important issue as native corporations develop land use strategies. There is also a possibility that land along the Karluk River will be purchased and made part of the Kodiak National Wildlife Refuge. If this happens, the land use strategies used by the USFWS will likely affect angler access.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Beginning in June 1993, a major research project was initiated on the Karluk River to monitor and document sport fishing harvest and effort for chinook salmon. In addition, biological data were collected from the escapement and sport harvest. USFWS collected the same information from the Ayakulik River in 1993 and 1994. The complete results are presented in a Fishery Data Series report (Schwarz 1996, Motis *In prep a*).

As part of the ongoing study to construct brood tables so that escapement goals can be refined, the Karluk and Ayakulik River chinook salmon escapements were sampled at the weir trap in 1996. In the Karluk a total of 143 chinook salmon were sampled. The dominant age classes were 1.4 (42%), 1.3 (21%) and 1.2 (16%). The sex ratio was 1.7 males/female.

The Ayakulik River chinook salmon escapement was also sampled at the weir trap in 1994. A total of 258 chinook salmon were sampled. The two dominant age classes were 1.4 (52%) and 1.3 (25%). The sex ratio was 1.6 males/female. The average length was 805 mm for age 1.4 and 724 mm for age 1.3.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Biological age, length, and sex data should continue to be sampled from the Karluk and Ayakulik river weir escapements. These data will allow brood tables to be constructed so that escapement goals can be refined.

Angler effort and catch information for anglers passing through the weir should continue to be collected and used as an inseason indicator of angler success (Table 34).

A land conveyance transpired in the lower Ayakulik River which will greatly impact public access, as this is a key area for rafters to end their trips and to board transport which will return them to the town of Kodiak. As part of the conveyance transactions, several exiting public easements (17B) were vacated and several more were created in order to accommodate people rafting the river and boarding transportation to exit the fishery. In order to clarify where public easements are located, as well as private, corporate and refuge land, a land ownership map of the Ayakulik River should be prepared. The map should be included in the Sport Fishing Guide which was developed by the Division of Sport Fish in order to inform the angling public of sport fishing opportunities.

The land situation on the Karluk River is probably more confusing because anglers who wish to camp or fish on the banks above the high water mark may need to obtain permits from two different property owners. In addition, there are four public easements (17B) along the river, however, only two are marked. A land ownership map should also be developed for the Karluk and made available to the public in order to reduce confusion during the fishery.

INSEASON MANAGEMENT APPROACH

The Karluk and Ayakulik rivers will be managed so that minimum escapement levels are met (Karluk 4,500, Ayakulik 6,500). Time of entry data have been compiled (Appendices G4 and G5) so that it is possible to project how many fish should be through the weir on any specific date in order to achieve a minimum spawning escapement objective. In order to achieve minimum spawning escapements, weir counts must total the minimum spawning objective plus the recent 3-year average sport fish harvest so that after the sport fish removal occurs a minimum spawning escapement will still be present.

The final weir count on the Karluk River should total 6,000 chinook salmon (4,500 minimum spawning goal + 1,200 sport fish harvest above weir + 300 hook-and-release mortality). Using the time of entry data in Appendix G4, an average of 50.3% of the weir count has been made by June 17. In order to achieve the minimum spawning objective a weir count of 3,000 (6,000 x .503) should be obtained by June 17. If the weir count is below 3,000 fish the sport fishery will be restricted so that minimum objectives can be reached. Restrictions may be imposed earlier than the mid point of the run (June 17) if it becomes apparent that the run is below average. Restrictions may include reductions in bag limits, elimination of catch and release fishing, or complete closures. The restriction chosen will be the one that impacts the fishery the least but still allows the minimum escapement objective to be achieved.

On the Ayakulik River the final weir count should total 7,600 (6,500 minimum spawning objective + 900 sport fish removal above the weir + 200 hook-and-release mortality). Similar to the Karluk River, the time of entry data on the Ayakulik River (Appendix G5) indicates that an average of 49.7% of the weir count has occurred by June 13. Therefore, to achieve a minimum spawning escapement a weir count of approximately 3,780 chinook salmon should have occurred by June 13.

Historical time of entry data for chinook salmon in the Karluk, Ayakulik and Chignik rivers are presented in Appendices G4, G5, and G6.

KARLUK RIVER SOCKEYE SALMON FISHERY

HISTORICAL PERSPECTIVE

Sockeye salmon return to the Karluk River from June through September. Sockeye salmon in the Karluk River drainage spawn from August through November with about one-third spawning in Karluk Lake and the remaining population spawning in the lake's tributaries. Sockeye salmon bound for the Karluk River are harvested in commercial, subsistence, and sport fisheries.

Daily bag and possession limits for salmon, other than chinook salmon, in the remote portions of the Kodiak Regulatory Area have been 5 per day, 5 in possession with no size limits. All fisheries for sockeye salmon are open year-round.

From 1986 through 1995, sport anglers have harvested an average of 1,300 sockeye salmon from Karluk drainage waters (Table 35). This harvest has accounted for an average of 15% of the total KMA sockeye salmon harvest over this period. Both Karluk Lake and Karluk River (and its tributaries) support sport fisheries for sockeye salmon. Sport harvests are generally small in relation to past levels of escapement, which exceeded 1 million sockeye salmon in 1989 and 1991.

Table 35.-Harvest of sockeye salmon from Karluk and Ayakulik rivers drainage waters of the Kodiak Management Area, 1986-1995.

	KMA	Karluk River			Ayakulik River		
Year	Harvest	Harvest	Released	% of KMA	Harvest	Released	% of KMA
1986	6,233	275		4			
1987	4,562	235		5			
1988	8,853	1,256		14			
1989	13,173	899		7			
1990	8,224	1,292		16			
1991	5,049	894		18	179	4,077	4
1992	6,240	798	4,634	13	633	4,389	10
1993	10,507	1,572 [a]	7,015	15	985 [b]	4,854	9
1994	13,502	3,627 [c]	4,678	27	1,223 [d]	1,754	9
1995	9,333	2,133	3,091	23	413	338	4
MEAN	7,504	1,299	4,855	15	687	3,083	7

Note: Estimates from Mills 1987-1994 and Howe et al. 1995 and 1996.

[a] A harvest of 337 and release of 460 sockeye salmon were documented on the Karluk River by an onsite creel census between June 1 and July 10. These figures do not include catches made at the Portage after July 10. From ADF&G creel survey/census.

[b] A harvest of 322 and release of 595 sockeye salmon were documented on the Ayakulik River between June 1 and July 10. These figures do not include catches made after July 10. From USFWS creel census.

[c] A harvest of 127 and a release of 687 sockeye were documented on the Karluk between June 1 and July 10. These figures do not include catches made below the weir. From ADF&G creel census.

[d] A harvest of 558 and release of 1,204 sockeye were documented on the Ayakulik River between June 1 and July 10. These figures do not include catches made after July 10. From USFWS creel census.

RECENT FISHERY PERFORMANCE

The sport harvest of sockeye salmon from Karluk drainage waters during 1995 (2,130) was the second highest on record (Table 35). This harvest accounted for 23% of the total sockeye salmon harvest from KMA waters during 1995. The sockeye harvest in the Ayakulik was 410 in 1995 and represented 4% of the KMA total harvest. Anglers released 45% of their catch in the Karluk and 45% of their catch in the Ayakulik. Statewide Harvest Survey estimates of sport harvest or catch are not available for this fishery for 1996 at this time.

RECENT BOARD OF FISHERIES ACTIONS

The Alaska Board of Fisheries adopted a public proposal at its December 1995 meeting which allows anglers in the remote area to have two daily bag limits of salmon other than chinook salmon in their possession. In the past, anglers were limited to 5 salmon other than chinook salmon in their possession. Beginning in 1996, anglers were allowed 10 in their possession.

CURRENT ISSUES

As private native owners and the Kodiak National Wildlife Refuge develop their respective land management strategies, maintaining adequate angler access to the Karluk River fishery will become necessary if this fishery is to exhibit continued growth.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are no specific research or management activities directed at this fishery at present.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

No specific research or management activities are recommended for this fishery at present.

NORTH KODIAK ISLAND ARCHIPELAGO MARINE BOTTOMFISH FISHERIES

HISTORICAL PERSPECTIVE

The marine waters of the Kodiak road system zone and the Afognak/Shuyak/Barren islands support a multitude of marine fish stocks. Of these stocks, halibut and rockfish are the most commonly targeted by recreational anglers. Salmon also represent a large portion of the marine catch. The majority of the halibut and rockfish are harvested from late April through early September. The daily bag and possession limits for halibut are 2 and 4, respectively. Bag and possession limits for rockfish and lingcod became effective in the spring of 1993. The bag and possession limits for rockfish are 10 and 20, respectively, and for lingcod 2 and 4. A season was also established for lingcod from July 1 through December 31.

From 1987 through 1994 anglers have expended an average of about 29,000 angler-days each year fishing for marine bottomfish in the KMA. About 75% of this effort is annually expended fishing for halibut with the remaining effort being directed towards rockfish (20%) and lingcod (5%) (Vincent-Lang 1995). In general, effort has been relatively stable over this period.

Since 1987, Kodiak road system and Afognak/Shuyak/Barren island marine waters have supported 77% of the total harvest of halibut and 75% of the historical harvest of rockfish from KMA waters (Table 36). From 1987 through 1995, sport anglers have harvested an average of 5,330 halibut and 4,030 rockfish from Kodiak Road System marine fisheries (Table 36). This

Table 36.-Harvest of halibut, rockfish and lingcod from Kodiak Road System and Afognak/Shuyak/Barren Island waters of the Kodiak Management Area, 1987-1995.

	KMA	Kodiak Road System		Afognak/Shuyak/Barren Is.	
Year	Harvest	Harvest	% of KMA	Harvest	% of KMA
HALIBUT					
1987	9,869	4,510	46	4,292	44
1988	7,749	3,600	47	3,512	45
1989	10,435	4,663	45	4,449	43
1990	11,679	4,845	42	3,630	31
1991	12,110	6,004	50	3,878	32
1992	13,505	5,071	38	4,178	31
1993	17,660	6,385	36	5,135	29
1994	17,312	6,074	35	5,039	29
1995	16,785	6,296	38	5,072	30
MEAN	12,947	5,332	42	4,338	35
ROCKFISH					
1987	8,547	3,223	38	3,278	38
1988	13,244	5,930	45	4,220	32
1989	5,325	2,637	50	1,505	28
1990	6,519	3,251	50	367	6
1991	8,215	5,882	72	1,502	18
1992	6,566	4,316	66	982	15
1993	8,350	5,340	64	781	9
1994	5,743	2,953	51	1,109	19
1995	4,806	2,729	57	806	17
MEAN	7,481	4,034	55	1,619	20
LINGCOD					
1991	2,345	729	31	259	11
1992	1,753	709	40	484	28
1993	1,120	324	47	198	18
1994	1,199	510	43	273	23
1995	1,007	579	57	167	17
MEAN	1,485	610	43	277	19

Note: Estimates from the Statewide Harvest Survey (Mills 1988-1994, Howe et al. 1995 and 1996).

harvest has accounted for an average of 42% and 55% of the total KMA halibut and rockfish harvest, respectively, over this period. Over this same period, the marine waters in proximity to the Afognak/Shuyak/Barren island group have supported sport harvests of 4,340 halibut and 1,620 rockfish (Table 36). These harvests have represented 35% of the total harvest of halibut and 20% of the rockfish harvest from KMA waters.

Although not a commonly targeted species, lingcod are also harvested in the KMA. From 1991 to 1995 the average harvest in the management area is 1,490 lingcod. The Kodiak road system accounts for an average of 43% of the KMA harvest, while the Afognak islands accounted for 19%.

Bottomfish sport fisheries are managed by Sport Fish staff from the Anchorage and Homer offices. A groundfish management report detailing harvest from these and other groundfish fisheries in Region II is published annually (Vincent-Lang 1994-1996).

RECENT FISHERY PERFORMANCE

The sport harvest of halibut from Kodiak Road System marine fisheries during 1995 (6,300) was above average (Table 36). The 1995 rockfish harvest (2,730) was below average. These harvests accounted for 38% and 57% of the total halibut and rockfish harvests, respectively, from KMA waters during 1995.

The sport harvest of halibut from Afognak/Shuyak/Barren island marine fisheries during 1995 (5,070) was above average while the sport harvest of rockfish during 1995 (810) was below average (Table 36). These harvests accounted for 30% and 17% of the total halibut and rockfish harvests, respectively, from KMA waters during 1995.

Effort and harvest estimates for marine bottomfish are not yet available for the 1996 season.

RECENT BOARD OF FISHERIES ACTIONS

The Board of Fisheries adopted regulations affecting rockfish and lingcod fisheries that became effective on Kodiak in June of 1993, halfway through the 1993 fishing season. Rockfish bag and possession limits were established at 10 and 20 fish, respectively, and lingcod limits were established at 2 and 4, respectively. A fishing season of July 1 through December 31 was established for lingcod in order to protect fish during spawning and nest guarding. Finally, a regulation was adopted where lingcod can only be landed by hand or with a landing net. Similar regulations were adopted for the Alaska Peninsula/Aleutian Islands Regulatory Area and went into effect for the 1995 fishing season.

CURRENT ISSUES

Concern was raised that several species of demersal rockfish were being overexploited in areas of high commercial fishing pressure in the KMA. This is especially true for the waters of Chiniak Bay in which most of the area's harvest occurs and where a directed commercial rockfish fishery developed in 1991. Managers believed that levels of commercial and sport harvests experienced during 1991 were not sustainable because similar levels of harvest in other areas of Alaska have lead to overexploitation of these species. The department, therefore, proposed limiting rockfish harvests. Restrictions adopted with respect to the sport fishery are listed above. Conservative quotas were placed on the commercial fishery so that no more than 100,000 pounds of rockfish could be harvested per year from Chiniak Bay. There is a 50,000 pound quota for waters near Ugak Bay from Cape Chiniak to Dangerous Cape and shoreward of the 3-mile territorial sea line.

These limits were based on the unique life history characteristics of these species (many of these species are long-lived and highly susceptible to overharvest) and other limits adopted for this species in other areas of the state. Although this commercial management plan did not go through the board process and become adopted as a regulation, it is being used to manage this new and developing fishery. The restrictions placed on the commercial and sport fisheries will help ensure stock conservation.

The implementation of the IFQ (Individual Fisheries Quota) harvest strategy by the North Pacific Management Council has the potential to greatly affect the sport fishery for halibut along the Kodiak road system. Since 1990 waters around Kodiak Island have been open to commercial fishing from 2 to 4 days per year. Under the IFQ system, these waters will be open March 15-November 15. If commercial harvest patterns change and more fishermen choose to fish in waters close to the town of Kodiak, the commercial halibut harvest in Chiniak Bay could increase, in turn lowering the numbers of fish available to sport anglers. If selection of large halibut by the commercial fishermen occurs due to price differentials based on fish size, then the size composition of the stocks available to sport anglers may also decrease. How the new commercial harvest strategy will affect the sport fishery remains to be seen. However, port sampling studies designed to characterize the size and age composition of sport caught halibut should detect significant changes through time. The Statewide Harvest Survey will also detect significant changes in sport catches. Unfortunately the International Pacific Halibut Commission has not documented commercial landings by specific location, so it will be impossible to compare how commercial harvest levels in Chiniak Bay change after the implementation of IFQs.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

The sport harvest of groundfish is sampled annually at the primary boat harbors in Kodiak. Data collected from various species of rock fish, lingcod, and halibut include length, weight, age, sex, gonad condition, and location of capture. These data are monitored for broad trends in species, age, and size composition that may be indicative of overharvest.

It is hoped that abundance and sustained yield can be estimated once a sufficient time series of data is available. Halibut age and size data are summarized by the department and forwarded to the International Pacific Halibut Commission for incorporation into their stock assessment models.

RECOMMENDED RESEARCH AND MANAGEMENT ACTIVITIES

Staff recommends continuation of the current research program.

DEVELOPING FISHERIES

Two fisheries for chinook salmon along the Kodiak Road system began to develop in 1992. One fishery harvests chinook which are returning from a department stocking project, and the other fishery harvests chinook in Chiniak Bay while trolling. This section describes the development of these fisheries, current stock status and recommends future management strategies.

MILL BAY CHINOOK SALMON/BUSKIN RIVER CHINOOK SMOLT RELEASE

HISTORICAL PERSPECTIVE

Beginning in 1989, the Department of Fish and Game stocked chinook salmon smolt in Island Lake, which drains into Mill Bay (Table 9). Approximately 100,000 smolt are transported from Elmendorf fish hatchery to Kodiak annually in May. Initially these fish were transported via barge which is costly and also stresses the fish. In 1991 over half of the smolt died in transport. In 1992 the smolt were flown to Kodiak on a National Guard C-130 as part of a training mission. The fish were released in excellent condition. In 1993, private industry objected to the use of government aircraft for transportation of the smolt. As a result, ferry transportation of smolt was initiated in 1993. A reduced load of 67,000 smolt was put aboard a hatchery tank truck and shipped to Kodiak via ferry. These smolt arrived and were released in healthy condition. The ferry was utilized in 1993 and 1994. Although fish arrived in good condition, they were not released for 24 hours after they were loaded onto the hatchery truck. The truck had to travel 400 miles before reaching the ferry terminal. There was a potential for the ferry departure to be delayed or the ferry trip to be rough due to poor weather. Both of these factors could increase stress, so in 1995 and 1996 air transportation was again used. During these years the U.S. Coast Guard provided C-130 transportation from the Elmendorf Hatchery to the Kodiak Coast Guard base. Fish were released approximately 3 hours after being loaded onto transport tanks in excellent condition.

In 1991, several adults returned to Mill Bay, and one 7 lb male was harvested. In 1992, the adult return was much larger. Scales were collected to determine age from eight fish which were landed between June 7 and 16. Six of these fish had readable scales, five were 3-ocean fish, and one was a 2-ocean fish. Fish ranged between 15 and 20 pounds. Mill Bay Beach was sporadically observed on eight occasions from June 7 to June 28. A total of 102 people were seen fishing during this time period. The department did not conduct a formal creel survey so an accurate estimate of harvest is not available. Based on sporadic observations and informal interviews from anglers who fished Mill Bay regularly, it was estimated that the harvest of chinook salmon at Mill Bay was approximately 50 fish. The 1992 Statewide Harvest Survey estimated a harvest of 117 chinook salmon.

RECENT FISHERY PERFORMANCE

In 1993 the harvest was estimated at 250 chinook salmon from periodic observations. The 1993 Statewide Harvest Survey estimated the harvest at 219 chinook salmon (Table 37). In 1994 a harvest estimate of 50 chinook salmon was made from fishery observations; the Statewide Harvest Survey later estimated 58 chinook salmon harvested. In 1995 informal observations indicated a chinook salmon harvest of between 50-100 chinook salmon. Twenty-seven chinook were reported harvested in the 1995 Statewide Harvest Survey.

Beginning in 1992 chinook salmon were noted in the Buskin River (15-30 fish). These fish likely strayed from the Mill Bay chinook salmon stocking project. In 1993, 1994 and 1995 the Buskin River was open to sport fishing for chinook salmon in order to harvest these chinook salmon. (Chiniak Bay streams have been closed to chinook salmon fishing. No natural runs exist in Chiniak Bay.)

Table 37.-Sport fish harvest of chinook salmon from the marine waters of Chiniak and Mill bays, 1987-1995.

Year	Mill Bay Harvest	Chiniak Bay Harvest
1987		18
1988		73
1989		84
1990		44
1991		188
1992	117	346
1993	219	1,548
1994	58	398
1995	27	759

Note: Estimates from the Statewide Harvest Survey (Mills 1988-1994, Howe et al. 1995 and 1996).

In 1996 very few people fished along Mill Bay Beach for chinook salmon. Informal observations indicate a harvest of less than 50 fish.

RECENT BOARD OF FISHERIES ACTIONS

At the December 1995 Board of Fisheries meeting a staff proposal to open all road system streams (except the Pasagshak drainage) to chinook salmon fishing was adopted and became effective during the 1996 season. The proposal was submitted to allow anglers to fish for adult chinook which were straying into the Buskin River from the Mill Bay release as well as anticipated returns from a chinook smolt release which began in the Buskin River in 1995. This regulation will also allow the harvest of chinook from other road system streams in case some fish stray into nearby streams (American, Salonie). The Pasagshak drainage is the only road system stream that has a self-perpetuating chinook return, and this stream will remain closed to chinook salmon fishing. The return to Pasagshak is very small, less than 100 fish annually, and is the result of an enhancement project which occurred in the late 1970s. This project attempted to establish a self-perpetuating chinook return. This return did not produce large enough numbers to sustain a sport fish harvest. The project was terminated, and fishing for chinook was closed in order to protect the small remnant return which still occurs there.

CURRENT ISSUES

The 1994 return was the first year when a full complement of age classes returned (i.e. returning adults that had spent 5 years at sea from the 1989 smolt release, 4-year ocean adults from the 1990 smolt release, etc.). In similar programs in the Homer area returns have averaged 3,000 adult chinook salmon from similarly sized smolt releases. The return of adults in 1994 and 1995 has been less than 300 fish annually, indicating that the Mill Bay stocking is not nearly as successful in producing adults as other similar projects. As a result of the poor returns, a fishery did not develop to generate the angler days of fishing opportunity that was originally desired.

The logistics associated with the smolt release at Mill Bay had several problems. The holding pen location (Island Lake Creek) had several disadvantages. Smolt were not easily held unless water flow conditions were just right, a situation which is not frequently present. As a result smolt have been released prematurely after being held and fed for only 1 day. It is possible that the smolt have not fully recovered from the stresses of transportation. If chinook salmon smolt are under stress when released, it is possible that their survival will be lowered and that they may not imprint well enough to return to Mill Bay Beach.

The return location (Mill Bay Beach) also has several disadvantages. Returning adults do not have an attractive holding area where they can school and be available to anglers. Small groups of adult chinook swim around Mill Bay, occasionally swimming within casting distance of the beach. Adults are unable to enter Island Lake Creek, and it appears that this results in straying into nearby streams. During 1994 chinook salmon were documented in streams on Spruce Island, in Little Afognak and in the Buskin River. Several options existed for increasing the return of adult chinook salmon. These included improving the holding facilities for smolt in Island Lake Creek, changing the brood source to a Kodiak Island stock, or changing the release location to the Buskin River. A Buskin River release location had several advantages. This change could be economical and easily accomplished; it would provide a return location where adults could easily school and would be more accessible to anglers. Because the Buskin River is

much larger than Island Lake Creek with greater water flow, holding smolt until they recover from stress would be possible. This, in turn, would likely allow more effective imprinting and increase the number of returning chinook to the release site.

Finally, the Buskin River provides a large area for anglers to fish from, helping to reduce crowding. To accomplish this change in release location the division obtained a fish transport permit to release chinook salmon smolt into Buskin River. Chinook smolt were released into the Buskin River in 1995 and 1996 (Table 9)

During the permitting process concerns were raised regarding the release of smolt in the Buskin River. Those expressing concern included department staff, Department of Natural Resources (Division of Parks), and the Kodiak Regional Aquaculture Association. Department concerns consisted largely of possible straying and consequent genetic mixing, that smolt released in the Buskin be tested and free of bacterial kidney disease, that returning chinook not be allowed to enter the lake and spawn, and that the return be monitored. Division of Park's concerns were related to the increased use of park facilities without increased funding to maintain them, destruction of river banks due to increased foot traffic, and increased regulation violations due to increased fishing effort. The Kodiak Regional Aquaculture Association's concern was that if the Buskin River sockeye stocks were enhanced to yield a sockeye surplus, then an unanticipated allocative dispute could occur between chinook anglers and purse seiners who might incidentally harvest chinook while targeting surplus Buskin sockeye.

The allocative issue was decided by the Commissioner of Fish and Game when he approved the stocking plan by signing the Fish Transport Permit. There are currently no plans to enhance the Buskin sockeye return to yield a commercially harvestable surplus of sockeye salmon, so the anticipated allocative dispute is a theoretical and not an actual problem. In addition, the success of the chinook stocking program will be evaluated on the amount of angling effort generated and not on the amount of chinook entering the Buskin River. Evaluation of the Buskin River chinook stocking program will be based upon successfully generating 2,000 angler-days of fishing effort.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

The issue of straying will be addressed by tagging a portion of each smolt release with coded wire tags (CWT). In 1995, 39,161 of the 83,758 smolt released were marked with CWTs. In 1996, 40,681 of the 103,800 smolt released had CWTs. The only natural returns of chinook salmon occurs in the Karluk and Ayakulik rivers. These rivers are 100 and 136 ocean miles to the southwest of the Buskin river, respectively. Beginning in 1997, when chinook from the Buskin River release will have been at sea for a combination of 1 and 2 years, 370 adult chinook will be examined at the Karluk and Ayakulik River weirs in order to detect any straying from the Buskin. Any returning adults that have been at sea for 1 year will be male. Normally the age class of chinook that return after being at sea for 2 years are composed of 90% males and 10% females. Sampling will continue annually at the Karluk and Ayakulik weirs.

Straying of returning adult chinook salmon from the Buskin River smolt release into nearby road system streams (Solonie, American, and Olds) will be monitored through foot surveys to document if straying is occurring. The genetic impact of chinook spawning in these streams is nonexistent because they do not contain native chinook stocks. Competition between rearing

coho and chinook fry would be minimal. Earlier attempts to establish large chinook returns in two other Kodiak Rivers (Pasagshak and Dog Salmon) were unsuccessful. This is likely due to poor chinook rearing habitat. Small returns of chinook still occur in the Pasagshak and Dog Salmon rivers. However, they remain closed to sport fishing because the returns are so small that any sport fish harvest could result in elimination of the return. All road system streams, with the exception of the Pasagshak, were opened to chinook salmon fishing to harvest any adults that return from the stocking program. It is likely that if any do stray into local road system streams that they will be harvested before they can spawn.

All smolt will be tested for bacterial kidney disease to ensure the release of healthy fish. The return of chinook will be documented by estimating the sport harvest, the subsistence harvest, and the spawning escapement. The sport harvest will be documented through the statewide harvest survey. The subsistence harvest will be documented by tallying returned subsistence permits. There is no commercial fishery in Chiniak Bay during June, however island-wide commercial harvests of chinook will be sampled in 1997 in order to quantify the contribution of marked stocks to the commercial fishery. Surveys of the Buskin River to document spawning chinook will be conducted in August.

The return timing will be documented through observations of the sport fishery by Buskin weir personnel. Subsistence harvest timing will be documented by Sport Fish Division personnel through observations while sampling the subsistence sockeye harvest. In addition to observations, subsistence fishermen are required to record the dates they harvest fish on their permit.

An inventory of current river bank conditions on the Buskin River was initiated in the spring of 1996 to help evaluate how an additional 2,000 angler-days of effort would affect river banks. Sites were established along the riverbank every 100 yards. Each site was photographed, recorded on video, and described in writing. Any erosion in the vicinity was noted. The first 1 mile of river (this includes the entire State Park) was completed in 1996 with the remainder to be mapped in 1997. The photo album, video, and text will record river bank condition prior to a chinook salmon return. This baseline record will allow us to determine if and to what extent river banks were eroded as a result of increased effort.

The Buskin River averaged 20,000 angler-days from 1986 to 1995 (Table 2) but has been declining recently. The 1995 Statewide Harvest Survey estimated 14,000 angler days of use. The reason for the recent decline is unclear, however may be related to a drop in popularity of the Dolly Varden fishery which occurs during the spring emigration (April 15-June 15). Prior to 1990, the annual harvest of Dolly Varden in the Buskin River averaged approximately 9,000 fish. Since 1990, the average harvest has dropped to less than 2,000 fish per year (Table 11). During the 1980s, nine creel surveys were conducted during the spring emigration. Angling effort averaged 4,300 angler days, with harvest averaging 5,500 fish (Table 12). Fishery observations in recent years indicate that fishing effort for Dolly Varden is considerably less than in past years, however an actual creel survey would need to be conducted to attribute the fishing decline in the Buskin River to the spring Dolly Varden fishery. Regardless of the cause, if the fishing effort on the Buskin remains at 1995 levels, angling effort may still be below average even if the chinook stocking program is successful and generates an additional 2,000 angler-days. If the effort levels in the Buskin return to average (20,000 angler days), an increase of 2,000

angler-days of effort would translate to a 10% increase in fishing effort. To put this increase in effort in perspective, it would consist of 65 people per day fishing for a 30-day period along a 4 mile long river. Even though this small increase in effort is unlikely to cause erosive damage to stream banks, the baseline bank condition inventory that began in 1996 will allow future impacts to be evaluated. If increased effort does lead to habitat destruction, the problem will be corrected or the project will be terminated.

In order to contribute to support facilities maintained in the State Park, the Sport Fish Division is paying for 100% of the toilet pumping and dumpster service for both the Buskin and Pasagshak State Parks. In 1995 the Buskin State Park, which contains 1 river mile, estimated they had over 90,000 visitors. This compares to our estimate of 14,000 angler-days along the entire 4 miles of river.

In order to maintain good regulation enforcement a joint meeting with the Sport Fish Division, Fish and Wildlife Protection, and the United States Coast Guard security was held in May of 1996 to discuss coordination of enforcement efforts. The Buskin River is located entirely on Coast Guard property, and it was agreed that base security would check for violations such as snagging, fishing in closed water, and over limits while on their routine patrols of the area. The Buskin River weir crew also received training from Fish and Wildlife personnel and were scheduled for regular patrols to check licenses and regulation compliance. Fish and Wildlife protection agreed to conduct patrols when their other duties allowed. Fishing violations are a social problem that these coordinated enforcement efforts have addressed, allowing an orderly fishery to develop. Violations have not been a biological issue because escapement goals for native species have consistently been met, and it is a goal to harvest all of the returning chinook.

Recommended Research and Management Activities

Research and management activities described above should be continued in 1997. Regular fishery observations should be made during June and early July in order to document catches of chinook in the Buskin River. Using average survival rates and age class compositions, approximately 300 fish will return from the 1995 smolt release. These fish should average approximately 7 pounds in weight and 95% should be males.

CHINIAK BAY CHINOOK SALMON

Historical Perspective

Chiniak Bay is a feeding area for chinook salmon as they grow and mature at sea. In the past these chinook salmon have been harvested in small numbers, often incidental to halibut or rockfish (Table 37). In 1992, anglers began to target on these chinook salmon by trolling. The estimated harvest for 1992 was 350 chinook salmon, significantly larger than the 1987-1990 average of 55. In 1993, 1994 and 1995 the Statewide Harvest Survey estimated the chinook salmon harvest at 1,550, 400 and 790 fish, respectively.

Recent Fishery Performance

Directed trolling for chinook salmon in Chiniak Bay continued during 1996. Based on informal interviews angler success in 1996 decreased slightly relative to 1995 with harvest likely to approximate 600 chinook salmon. The 1996 harvest is a significant decrease from the harvest of 1,550 fish in 1993. The reason for the decrease in catch is unknown. However, it is likely due to

a drop in abundance of chinook salmon feeding in Chiniak Bay waters. The observed decrease in sport catches is consistent with decreased commercial harvest in the Kodiak area which decreased from 42,000 in 1993 to 19,000 in 1995. The commercial harvest of 13,500 chinook in 1996 (Appendix B4) was the lowest since 1987. This low harvest was partly due to less fishing time in response to the poor pink salmon returns. The commercial harvest of chinook salmon is a nondirected incidental harvest and probably represents an index of chinook salmon abundance around Kodiak Island. Factors such as the amount of fishing time for targeted species will also affect the magnitude of the incidental harvest. The abundance of chinook salmon feeding in Chiniak Bay may fluctuate yearly based on such factors as water temperature and abundance of forage fish, as well as the abundance of Pacific Coast chinook salmon stocks.

CURRENT ISSUES

Harvests of chinook salmon, particularly in marine waters, have received increasing attention throughout the Pacific Northwest in recent years. Management of chinook salmon is difficult because of their migratory behavior. Chinook salmon are often harvested far beyond the political boundaries encompassing their natal streams, resulting in area, state, and international allocative issues. Conflicts concerning implementation of the Endangered Species Act (ESA), U.S.-Canada treaty negotiations, and allocations between competing users are some of the major issues which could develop in regard to this fishery, however the small harvest currently occurring in the Chiniak Bay sport fishery could preclude this fishery from becoming controversial. Also, as stated under the section on recent performance, this fishery may not be an expanding fishery as much as a sporadic opportunistic fishery, depending on fish abundance which changes annually based on a variety of environmental conditions.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

Beginning in 1994 systematic sampling of the sport harvest of troll-caught chinook salmon for biological data and coded wire tags began. From May 28 through September 11, 112 chinook salmon were examined for the presence of coded wire tags, and 63 were sampled for age, length and sex information. Results are listed in the 1994 Annual Management Report (Tables 34 and 35 from Schwarz 1995). Sport harvests were sampled from charter and private vessels when they returned to harbor. In addition, marked ADF&G totes were left at the harbor for collection of sport caught halibut, rockfish, lingcod and salmon carcasses. Chinook salmon carcasses left in these totes where checked for the presence of coded wire tags. These fish could not be sampled for biological data since they were already filleted. In addition to the sampling project information, department personnel reported their off-duty sport harvest from trips they made. These data were added to the data collected during the sampling project. Two of the three coded wire tags recovered were made from chinook salmon harvested by department employees. All three fish were tagged in British Columbia. Two of the tagging locations were 40 miles south of the Alaska/Canadian border, at Masset and Kitimat River. The third originated from Snootli Creek, about 200 miles south of the Alaska/Canada border.

This study was continued in 1995. Of the 201 chinook salmon observed for coded wire tags, only one chinook salmon had a tag. This tag was from a private nonprofit hatchery near Sitka (Medvejie) and the fish was released on June 2, 1993. It was captured in Chiniak Bay on September 3, 1995. Of the 164 chinook salmon sampled for age data in 1996, the dominant age classes were 1.2 and 1.3, which made up 26% and 51% of the sample, respectively. During

1994, age classes 1.2 and 1.3 were also the dominant age class, making up 18% and 75%, respectively.

During 1996, 134 chinook salmon were checked for coded wire tags, but none were found (Table 38). Age data were taken from 18 fish. Age classes 1.3 and 1.4 were again dominant, accounting for 56% and 22%, respectively (Table 39).

OTHER FISHERIES

Several smaller fisheries for other species also occur in the KMA. These include fisheries for wild rainbow trout, chum salmon, smelt, and clams. Because these fisheries are generally small, little specific management or research is directed towards them nor have specific management or fishery objectives been set for these fisheries. A brief summary of these fisheries is provided below.

RAINBOW TROUT

Wild stocks of rainbow trout occur in several systems within the Kodiak Archipelago. Some of the most popular known rainbow trout systems include the Afognak River, Malina River, Upper Station Creek, Little River, and Uganik River. All of these rainbow trout populations are small, as is the average size of the trout. Documenting the harvest is difficult because of the small fishing effort that these remote populations receive. Documenting harvest is further complicated because anglers confuse steelhead and rainbow trout. A steelhead is a type of rainbow trout which spends part of its life in salt water. On Kodiak, steelhead attain a larger size due to better growing conditions experienced in salt water. However, the only definite way to distinguish whether some fish are large rainbows or small steelhead is to examine a scale under a microscope for saltwater growth. Appendix A8 lists harvest estimates from the Statewide Harvest Survey for rainbow trout in stocked lakes, rainbow trout in wild populations and steelhead in fresh water. In 1995 an estimated 1,739 rainbow trout were caught and 132 were harvested from wild populations.

Very little is known about the locations of rainbow trout populations in the Aleutians or in streams along the Alaska Peninsula. These populations are even more remote and fished less than the populations on Kodiak. For these reasons catch and harvest estimates are not listed for the Aleutians/Alaska Peninsula.

The average sport harvest and catch of wild rainbow trout from the waters of the Kodiak Regulatory Area from 1989 through 1995 was 430 and 3,870, respectively. In addition, approximately 20 roadside lakes are stocked along the Kodiak road system. The harvest and catch of rainbow trout from these lakes in 1995 was estimated at 150 and 360, respectively (Howe et al. 1996) (Appendix A8).

CHUM SALMON

Chum salmon have not been typically targeted by recreational anglers in the KMA, however, some are taken incidentally to other salmon species. An average of only 1,160 chum salmon have been harvested per year by sport anglers from KMA waters from 1977 through 1995 (Appendix A11). Most (86%) of the annual chum salmon harvest has occurred in the waters of the Kodiak Regulatory Area.

Table 38.-Chinook salmon examined for the presence of coded wire tags from the Chiniak Bay sport fishery harvest, 1996.

Date	# Chinook Observed	# Chinook with CWT
4-Jul	4	0
15-Jul	5	0
17-Jul	1	0
18-Jul	3	0
20-Jul	2	0
24-Jul	3	0
25-Jul	12	0
26-Jul	5	0
30-Jul	4	0
3-Aug	11	0
4-Aug	7	0
7-Aug	1	0
10-Aug	4	0
11-Aug	16	0
17-Aug	4	0
23-Aug	7	0
24-Aug	26	0
26-Aug	6	0
3-Sep	8	0
5-Sep	7	0
9-Sep	2	0
Total	134	0

Table 39.-Age composition by age and mean length at age for chinook salmon in the Kodiak marine sport fishery, 4 July through 9 September 1996.

	Age									
	0.3	0.4	1.1	1.2	1.3	1.4	1.5	2.2	2.3	Total
Females:										
Sample Size					1	3			1	5
Percent					5.5	16.7			5.5	27.8
SE Percent					5.5	9.0			5.5	10.9
Mean length					798	806			872	817.6 [a]
SE mean length						30				21
Minimum length					798	749			872	749
Maximum length					798	850			872	872
Males:										
Sample Size				2	9	1		1		13
Percent				11.1	50.0	5.5		5.5		72.2
SE Percent				7.6	12.1	5.5		5.5		10.9
Mean length				735	788	781		662		784.8
SE mean length				15	18					15
Minimum length				720	715	781		662		715
Maximum length				750	847	781		662		894
All:										
Sample Size				2	10	4		1	1	18 [b]
Percent				11.1	55.5	22.2		5.5	5.5	100.0
SE Percent				7.6	12.0	10.1		5.5	5.5	0.0
Mean length				735	789	800		662	872	792.3 [c]
SE mean length				15	16	22				13
Minimum length				720	715	749		662	872	715
Maximum length				750	847	850		662	872	894

[a] n = includes 4 fish for which age was not estimated.

[b] n = does not include 4 fish for which age was not estimated.

[c] Includes 4 fish whose lengths were recorded but no age was estimated.

CLAMS

From 1977 through 1995, the average harvest of razor clams was 3,830, all of which were reported from the Kodiak Regulatory Area (Appendix A7). Kodiak Island has only a small number of beaches which produce razor clams. It is probable that much of the clam harvest is misreported and people may be reporting all clams harvested as razor clams. It appears unlikely that the large harvests reported are possible given the small number of beaches which produce razor clams in the Kodiak regulatory area.

OTHER FISH

From 1977 through 1995, the average harvest of other fish in the Kodiak management area has been 5,480 (Table 4). This harvest has represented an average of 6% of the total sport fish harvest from KMA waters over this period. Other fish may include such species as cod, flounder and sculpins.

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APPENDIX A. RECREATIONAL FISH HARVESTS BY SPECIES, BY ANGLERS FISHING KODIAK MANAGEMENT AREA WATERS, 1977-1995

Appendix A1.-Number of Dolly Varden/Arctic char harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	15,900					1,364	9	1,084	8	13,452	93	14,536	91
1978	16,962					1,157	7	2,830	18	12,975	82	15,805	93
1979	33,311					7,890	24	5,281	21	20,140	79	25,421	76
1980	30,685					10,022	33	2,979	14	17,684	86	20,663	67
1981	31,482	3,402	28	8,564	72	11,966	38	2,441	13	17,075	88	19,516	62
1982	36,065	4,695	38	7,599	62	12,294	34	5,931	25	17,840	75	23,771	66
1983	30,192	2,843	26	7,910	74	10,753	36	3,934	20	15,505	80	19,439	64
1984	28,528	1,536	28	3,900	72	5,436	19	4,814	21	18,278	79	23,092	81
1985	22,562	659	13	4,387	87	5,046	22	2,291	13	15,225	87	17,516	78
1986	26,459	2,069	36	3,733	64	5,802	22	6,375	31	14,282	69	20,657	78
1987	15,831	2,083	30	4,985	71	7,068	45	2,299	26	6,464	74	8,763	55
1988	22,592	2,148	55	1,781	45	3,929	17	8,004	43	10,659	57	18,663	83
1989	18,635	1,392	32	2,977	68	4,369	23	2,771	19	11,495	81	14,266	77
1990	21,052	2,524	37	4,293	63	6,817	32	6,042	42	8,193	58	14,235	68
1991	21,418	3,920	47	4,416	53	8,336	39	2,996	23	10,086	77	13,082	61
1992	11,525	1,810	44	2,326	56	4,136	36	1,540	21	5,849	79	7,389	64
1993	10,008	1,677	45	2,032	55	3,709	37	1,644	26	4,655	74	6,299	63
1994	6,608	368	59	259	41	627	9	1,281	21	4,700	79	5,981	91
1995	9,263	867	45	1,927	55	2,794	30	1,338	21	5,131	79	6,468	70
MEAN [a]	21,565	2,155	38	4,083	62	5,983	28	3,473	22	12,111	76	15,676	72

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A2.-Number of pink salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	14,634					115	1	5,074	35	9,445	65	14,519	99
1978	18,374					635	4	7,693	43	10,046	57	17,739	97
1979	19,698					3,827	19	8,853	56	7,018	44	15,871	81
1980	30,093					11,124	37	8,223	43	10,746	57	18,969	63
1981	20,650	6,555	78	1,836	22	8,391	41	4,677	38	7,582	62	12,259	59
1982	30,462	8,593	74	3,019	26	11,612	38	8,153	43	10,697	57	18,850	62
1983	12,870	3,200	81	734	19	3,934	31	2,780	31	6,156	69	8,936	69
1984	17,343	4,011	88	553	12	4,564	26	4,314	34	8,465	66	12,779	74
1985	15,426	672	34	1,331	67	2,003	13	5,739	43	7,684	67	13,423	87
1986	17,365	350	12	2,506	88	2,856	16	4,769	33	9,740	67	14,509	84
1987	13,532	681	36	1,189	64	1,870	14	5,252	45	6,410	55	11,662	86
1988	31,296	1,640	13	10,612	87	12,252	39	10,040	53	9,004	47	19,044	61
1989	29,176	7,252	64	4,130	36	11,382	39	7,566	43	10,228	58	17,794	61
1990	29,997	12,301	55	10,232	45	22,533	75	2,476	33	4,988	67	7,464	25
1991	20,789	3,923	45	4,760	55	8,683	42	5,132	42	6,974	58	12,106	58
1992	11,473	2,538	46	3,031	54	5,569	49	2,113	36	3,791	64	5,904	51
1993	15,534	1,983	62	1,227	38	3,210	21	5,637	46	6,687	54	12,324	79
1994	6,032	594	85	102	15	696	12	2,147	40	3,189	60	5,336	88
1995	13,185	776	62	483	38	1,259	10	5,723	48	6,203	52	11,926	90
MEAN [a]	19,419	3,724	56	2,984	44	6,055	30	5,650	41	7,715	59	13,364	74

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A3.-Number of coho salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	5,722					1,006	18	1,172	25	3,544	75	4,716	82
1978	6,033					1,106	18	1,433	29	3,494	71	4,927	82
1979	12,496					974	8	3,606	31	7,916	69	11,522	92
1980	14,319					1,627	11	5,442	43	7,250	57	12,692	89
1981	11,696	475	43	637	57	1,112	10	4,449	42	6,135	58	10,584	91
1982	14,627	491	38	807	62	1,298	9	6,612	50	6,717	50	13,329	91
1983	9,678	943	51	912	49	1,855	19	2,025	26	5,798	74	7,823	81
1984	15,892	1,059	83	221	17	1,280	8	6,945	48	7,667	53	14,612	92
1985	15,032	523	37	884	63	1,407	9	6,209	46	7,416	54	13,625	91
1986	25,458	1,062	23	3,523	77	4,585	18	9,220	44	11,653	56	20,873	82
1987	19,402	1,567	63	923	37	2,490	13	8,056	48	8,856	52	16,912	87
1988	21,379	558	22	2,012	78	2,570	12	6,786	36	12,023	64	18,809	88
1989	23,700	2,288	59	1,610	41	3,898	16	5,338	27	14,464	73	19,802	84
1990	20,065	1,360	22	4,977	79	6,337	32	5,916	43	7,812	57	13,728	68
1991	21,327	1,045	29	2,591	71	3,636	17	6,790	62	10,901	62	17,691	83
1992	16,540	1,099	38	1,773	62	2,872	17	5,640	41	8,028	59	13,668	83
1993	22,693	965	66	487	34	1,452	6	7,877	37	13,364	63	21,241	94
1994	14,600	772	35	1,422	65	2,194	15	5,187	42	7,219	58	12,406	85
1995	15,194	989	51	969	49	1,958	13	6,063	46	7,173	54	13,236	87
MEAN [a]	15,787	1,012	45	1,523	55	2,226	14	5,431	40	8,130	60	13,562	86

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A4.-Number of halibut harvested by sport anglers fishing KMA waters, 1977-1995.

		Alaska Peninsula & Aleutian Islands		Kodiak Island	
	KMA				
Year	Total	Harvest	% of KMA	Harvest	% of KMA
1977	994	0	0	994	100
1978	1,721	0	0	1,721	100
1979	3,013	0	0	3,013	100
1980	3,651	0	0	3,651	100
1981	7,711	853	11	6,858	89
1982	9,977	797	8	9,180	92
1983	8,809	264	3	8,545	97
1984	9,148	969	11	8,179	89
1985	7,839	536	7	7,303	93
1986	11,975	1,015	9	10,960	92
1987	11,465	1,596	14	9,869	86
1988	9,697	1,948	20	7,749	80
1989	11,847	1,412	12	10,435	88
1990	11,679	2,545	22	9,134	78
1991	17,309	5,199	30	12,110	70
1992	13,505	2,645	20	10,860	80
1993	17,660	3,491	20	14,169	80
1994	17,312	2,402	14	14,910	86
1995	16,785	2,796	17	13,989	83
MEAN	10,091	1,495	12	8,429	88

Appendix A5.-Number of sockeye salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,848					593	32	102	8	1,153	92	1,255	68
1978	2,241					465	21	479	27	1,297	73	1,776	79
1979	4,134					1,698	41	330	14	2,106	87	2,436	59
1980	4,114					1,936	47	809	37	1,369	63	2,178	53
1981	4,698	994	32	2,084	68	3,078	66	669	41	951	59	1,620	35
1982	4,532	1,058	72	419	28	1,477	33	1,079	35	1,976	65	3,055	67
1983	4,438	534	42	754	59	1,288	29	986	31	2,164	69	3,150	71
1984	6,358	913	94	60	6	973	15	1,272	24	4,113	76	5,385	85
1985	8,225	199	29	490	71	689	8	1,714	23	5,822	77	7,536	92
1986	6,233	174	18	800	82	974	16	1,590	30	3,669	70	5,259	84
1987	4,562	231	58	166	42	397	9	1,106	27	3,059	73	4,165	91
1988	8,853	2,198	84	433	17	2,631	30	1,019	16	5,203	84	6,222	70
1989	13,173	5,147	81	1,237	19	6,384	49	1,606	24	5,183	76	6,789	52
1990	8,224	1,181	55	987	46	2,168	26	1,985	33	4,071	67	6,056	74
1991	7,057	1,287	64	721	36	2,008	29	960	19	4,089	81	5,049	72
1992	8,408	1,470	68	698	32	2,168	26	1,299	21	4,941	79	6,240	74
1993	10,507	1,976	74	682	36	2,658	25	1,968	25	5,881	75	7,849	75
1994	13,502	374	37	626	63	1,000	7	1,825	15	10,677	85	12,502	93
1995	9,333	668	50	671	50	1,339	14	2,228	28	5,766	72	7,994	86
MEAN [a]	6,858	1,229	57	722	43	1,786	28	1,209	25	3,862	75	5,072	72

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A6.-Number of rockfish harvested by sport anglers fishing KMA waters, 1977-1995.

		Alaska Peninsula & Aleutian Islands		Kodiak Island	
Year	KMA Total	Harvest	% of KMA	Harvest	% of KMA
1977	2,810	0	0	2,810	100
1978	1,907	0	0	1,907	100
1979	3,599	0	0	3,599	100
1980	1,489	0	0	1,489	100
1981	6,663	421	6	6,242	94
1982	4,170	178	4	3,992	96
1983	3,314	62	2	3,252	98
1984	9,347	1,116	12	8,231	88
1985	4,890	199	4	4,691	96
1986	5,165	686	13	4,479	87
1987	8,547	2,046	24	6,501	76
1988	13,244	1,875	14	11,369	86
1989	5,325	255	5	5,070	95
1990	6,519	2,677	41	3,842	60
1991	9,259	1,044	11	8,215	89
1992	8,106	2,454	30	5,652	70
1993	8,350	781	9	7,569	91
1994	5,761	742	13	5,019	87
1995	4,806	559	12	4,247	88
MEAN	5,964	797	10	5,169	90

Appendix A7.-Number of clams harvested by sport anglers fishing KMA waters, 1977-1995.

	Kodiak Island
	Harvest
1977	7,474
1978	3,208
1979	8,363
1980	11,826
1981	3,452
1982	1,944
1983	2,000
1984	7,360
1985	4,970
1986	7,064
1987	2,155
1988	4,614
1989	1,477
1990	173
1991	119
1992	973
1993	1,286
1994	4,322
1995	0
MEAN	3,828

Appendix A8.-Number of rainbow trout and steelhead caught and harvested by sport anglers fishing in fresh waters of the Kodiak regulatory area, 1989-1995.

	Rainbow Trout Stocked Lakes[a]		Rainbow Trout Wild Populations[b]		Steelhead Fresh water[c]	
Year	Caught	Harvested	Caught	Harvested	Caught	Harvested
1989		777		807		489
1990	2,831	812	4,352	672	3,108	672
1991	843	472	8,346	765	1,720	244
1992	1,314	901	3,324	246	1,552	80
1993	1,055	135	2,750	128	6,480	199
1994	1,062	470	2,751	261	3,400	146
1995	357	151	1,739	132	1,922	64

[a] Listed under roadside lakes in the Statewide Harvest Survey. Reports of harvested steelhead are assumed to be rainbow trout.

[b] Listed under other streams, other lakes, Buskin, Pasagshak and Saltery rivers in the Statewide Harvest Survey report. Only fish reported as rainbow trout are counted.

[c] Listed under Buskin, Pasagshak, Karluk, Red and Saltery, other streams and other lakes. Saltwater catches are not included. In the Karluk and Red rivers rainbow trout are considered as steelhead.

Appendix A9.-Number of smelt harvested by sport anglers fishing KMA waters, 1977-1995.

		Alaska Peninsula & Aleutian Islands		Kodiak Island	
	KMA				
Year	Total	Harvest	% of KMA	Harvest	% of KMA
1977	9,969	4,317	43	5,652	57
1978	4,523	4,523	100	0	0
1979	2,515	1,572	63	943	38
1980	4,103	2,011	49	2,092	51
1981	3,024	864	29	2,160	71
1982	2,620	0	0	2,620	100
1983	0	0	0	0	0
1984	96	96	100	0	0
1985	25	0	0	25	100
1986	0	0	0	0	0
1987	462	0	0	462	100
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	0	0	0	0	0
1991	0	0	0	0	0
1992	1,222	1,082	89	140	11
1993	67	0	0	67	100
1994	0	0	0	0	0
1995	0	0	0	0	0
MEAN	1,577	819	41	802	54

Appendix A10.-Number of chinook salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula/Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,113					630	57	34	7	449	93	483	43
1978	583					233	40	12	3	338	97	350	60
1979	1,176					424	36	98	13	654	87	752	64
1980	723					396	55	60	18	267	82	327	45
1981	1,264	129	28	346	73	475	38	194	25	595	75	789	62
1982	2,576	1,351	93	105	7	1,456	57	167	15	953	85	1,120	44
1983	1,295	493	87	73	13	566	44	198	27	531	3	729	56
1984	1,196	112	41	163	59	275	23	210	23	711	77	921	77
1985	1,133	0	0	371	100	371	33	162	21	600	79	762	67
1986	830	0	0	310	100	310	37	168	32	352	68	520	63
1987	1,002	42	7	581	93	623	62	54	14	325	86	379	38
1988	2,153	31	5	558	95	589	27	145	9	1,419	91	1,564	73
1989	2,226	234	21	905	80	1,139	51	120	11	967	89	1,087	49
1990	1,156	140	88	20	13	160	14	66	7	930	93	996	86
1991	2,752	56	23	168	77	244	9	198	8	2,310	92	2,508	91
1992	2,671	210	46	244	54	454	17	585	26	1,632	74	2,217	83
1993	5,738	147	23	499	67	646	11	2,454	48	2,638	52	5,092	89
1994	3,303	117	85	20	15	137	4	668	21	2,498	79	3,166	96
1995	2,859	25	11	212	89	237	8	1,138	43	1,484	57	2,622	92
MEAN [a]	1,874	206	38	305	63	494	34	352	19	1,028	80	1,380	67

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A11.-Number of chum salmon harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

		Alaska Peninsula /Aleutian Island Regulatory Area						Kodiak Island Regulatory Area					
	KMA	Salt Water		Fresh Water		Area Total		Salt Water		Fresh Water		Area Total	
Year	Total	Harvest	Percent	Harvest	Percent	Total	% of KMA	Harvest	Percent	Harvest	Percent	Total	% of KMA
1977	1,869					224	12	633	39	1,012	62	1,645	88
1978	1,619					332	21	624	49	663	52	1,287	80
1979	591					91	15	382	76	118	24	500	85
1980	1,334					809	61	405	77	120	23	525	39
1981	1,166	335	63	194	37	529	45	151	24	486	76	637	55
1982	2,567	472	38	771	62	1,243	48	639	48	685	52	1,324	52
1983	963	0	0	147	100	147	15	462	57	354	43	816	85
1984	1,609	126	44	162	56	288	18	799	61	522	40	1,321	82
1985	915	0	0	50	100	50	6	167	19	698	81	865	95
1986	541	25	12	180	88	205	38	122	36	214	64	336	62
1987	792	23	10	209	90	232	29	198	35	362	65	560	71
1988	1,824	0	0	278	100	278	15	73	5	1,473	95	1,546	85
1989	941	104	34	206	67	310	33	225	36	406	64	631	67
1990	412	0	0	221	100	221	54	36	19	155	81	191	46
1991	1,612	0	0	95	100	95	6	417	27	1,100	73	1,517	94
1992	913	273	95	15	5	288	32	92	15	533	85	625	68
1993	786	282	100	0	0	282	36	252	50	252	50	504	64
1994	380	83	92	7	8	90	24	100	34	190	66	290	76
1995	1,144	10	6	153	94	163	14	441	45	540	55	981	86
MEAN [a]	1,156	116	34	137	68	310	27	327	39	520	62	847	73

[a] Averages for the fresh and saltwater fisheries for the Alaska Peninsula/Aleutian Islands Regulatory Area do not add up to the total average for the regulatory area due to incomplete data for the years 1977 through 1980.

Appendix A12.-Number of steelhead trout harvested by sport anglers fishing Kodiak Management Area waters, 1977-1995.

	Kodiak Island Regulatory Area				
	Salt Water		Fresh Water[a]		Area Total
Year	Harvest	Percent	Harvest	Percent	Total
1977	3	1	229	99	232
1978	0	0	162	100	162
1979	9	3	309	97	318
1980	17	3	654	98	671
1981	0	0	313	100	313
1982	0	0	259	100	258
1983	10	3	292	97	302
1984	124	18	572	82	696
1985	426	54	364	46	790
1986	168	52	153	48	321
1987	181	72	72	29	253
1988	636	67	308	33	944
1989	249	34	489	66	738
1990	448	40	672	60	1,120
1991	428	64	244	36	672
1992	48	38	80	62	128
1993	249	55	199	45	443
1994	97	40	146	60	243
1995	30	32	64	68	94
MEAN	165	31	295	69	459

Note: No significant harvest occurs in the Alaska Peninsula/Aleutian Island Regulatory area. All reported harvest is from the Kodiak Island Regulatory area.

[a] Listed in Mills as steelhead under Buskin, Pasagshak, Karluk, Red, Saltery, other streams and other lakes. In the Karluk and Red rivers rainbow trout are also considered to be steelhead.

Appendix A13.-Number of Arctic grayling harvested by sport anglers fishing KMA waters, 1977-1995.

	Kodiak Island Harvest[a]
1977	54
1978	325
1979	124
1980	465
1981	119
1982	225
1983	126
1984	286
1985	820
1986	15
1987	72
1988	182
1989	189
1990	86
1991	98
1992	120
1993	16
1994	41
1995	0
MEAN	178

[a] All of the harvest occurs in fresh water.

APPENDIX B. COMMERCIAL SALMON HARVESTS FOR THE KMA

Appendix B1.-Commercial harvests (thousands of fish) of pink salmon from KMA waters, 1977-1996.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA						
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1977	1,449	1	0	1,450	605	6,252	8,307
1978	5,609	467	38	6,114	985	15,004	22,103
1979	6,571	5	539	7,115	2,057	11,287	20,459
1980	7,962	302	2,598	10,861	1,126	17,290	29,278
1981	5,036	11	303	5,350	1,163	10,337	16,850
1982	6,735	12	1,448	8,195	876	8,076	17,147
1983	2,828	3	2	2,833	321	4,603	7,757
1984	11,589	27	2,310	13,926	446	10,884	25,256
1985	4,434	3	0	4,437	175	7,335	11,947
1986	4,032	23	43	4,097	647	11,504	16,249
1987	1,209	4	0	1,212	247	5,073	6,533
1988	7,045	65	183	7,293	2,997	14,262	24,552
1989	7,293	4	7	7,304	888	22,649	30,841
1990	2,866	518	283	3,666	555	5,984	10,206
1991	10,616	4	0	10,620	1,169	16,643	28,432
1992	9,770	194	312	10,276	1,554	3,311	15,141
1993	9,928	5	0	9,933	1,648	34,019	45,600
1994	9,180	225	859	10,265	431	8,163	18,859
1995	16,294	12	0	16,306	2,065	42,831	61,202
1996	2,189	54	0	2,243	184	3,467	8,137
MEAN	6,632	97	446	7,174	1,007	12,949	29,092

Appendix B2.-Commercial harvests (thousands of fish) of coho salmon from KMA waters, 1977-1996.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA						
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1977	2	34	0	36	17	28	82
1978	61	63	0	124	20	49	193
1979	356	113	0	469	93	141	704
1980	274	128	0	402	118	139	659
1981	162	155	0	318	79	122	519
1982	256	238	0	494	300	344	1,138
1983	128	75	0	203	62	158	423
1984	309	199	0	508	110	230	848
1985	173	168	0	341	207	284	832
1986	236	164	0	400	117	168	685
1987	225	172	0	397	150	192	739
1988	506	234	0	740	370	303	1,413
1989	444	228	0	672	67	141	880
1990	307	193	0	500	130	294	924
1991	317	217	0	534	166	325	1,025
1992	418	207	0	625	311	280	1,216
1993	220	64	0	284	229	313	826
1994	256	241	0	497	237	296	1,030
1995	263	136	0	399	282	308	989
1996	279	157	0	436	193	202	1,267
MEAN	260	159	0	419	163	216	821

Appendix B3.-Commercial harvests (thousands of fish) of sockeye salmon from KMA waters, 1977-1996.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA						
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1977	312	471	0	783	1,972	623	3,378
1978	580	896	2	1,478	1,576	1,072	4,126
1979	1,150	1,980	12	3,142	1,064	632	4,838
1980	3,614	1,397	9	5,020	846	651	6,517
1981	2,255	1,845	5	4,105	1,840	1,289	7,234
1982	2,346	1,435	3	3,784	1,522	1,205	6,511
1983	2,557	2,093	4	4,654	1,823	1,232	7,709
1984	2,318	1,735	67	4,120	2,662	1,951	8,733
1985	2,215	2,601	3	4,819	946	1,843	7,608
1986	1,223	2,437	8	3,668	1,646	3,155	8,469
1987	1,450	1,209	0	2,659	1,899	1,793	6,351
1988	1,473	1,528	4	3,005	796	2,698	6,499
1989	2,661	1,719	8	4,388	1,157	2,629	8,174
1990	2,387	2,416	12	4,815	2,094	5,248	12,157
1991	2,322	2,392	1	4,715	1,896	5,704	12,315
1992	3,446	3,575	3	7,024	1,277	4,168	12,469
1993	3,689	3,867	0	7,556	1,697	4,378	13,631
1994	2,107	2,753	0	4,860	1,619	2,877	9,356
1995	3,039	3,273	0	6,311	1,724	4,485	12,520
1996	1,521	1,911	0	3,432	1,958	4,970	13,792
MEAN	2,132	2,076	7	4,217	1,601	2,630	8,618

Appendix B4.-Commercial harvests (thousands of fish) of chinook salmon from KMA waters, 1977-1996.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA						
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1977	0	6	0	6	1	1	8
1978	1	14	0	15	2	3	20
1979	2	17	0	19	1	2	22
1980	5	17	0	22	2	1	25
1981	10	18	0	28	3	1	32
1982	10	30	0	40	5	1	46
1983	27	30	0	57	6	4	67
1984	9	23	0	32	4	5	41
1985	8	24	0	32	2	5	39
1986	6	12	0	18	3	4	25
1987	9	14	0	23	3	5	31
1988	11	17	0	28	7	22	57
1989	7	11	0	18	4	5	27
1990	17	12	0	29	10	19	58
1991	8	9	0	17	3	22	42
1992	8	13	0	21	11	24	56
1993	14	24	0	38	20	42	100
1994	10	19	0	28	4	23	55
1995	17	8	0	25	5	19	49
1996	5	5	0	10	3	13	36
MEAN	9	16	0	26	5	11	42

Appendix B5.-Commercial harvests (thousands of fish) of chum salmon from KMA waters, 1977-1996.

	ALASKA PENINSULA/ALEUTIAN ISLAND AREA						
YEAR	SOUTH PENINSULA	NORTH PENINSULA	ALEUTIAN	AREA TOTAL	CHIGNIK	KODIAK	GRAND TOTAL
1977	243	129	0	372	111	1,072	1,555
1978	547	163	0	710	121	814	1,645
1979	483	66	0	549	188	358	1,095
1980	1,351	700	5	2,056	313	1,076	3,445
1981	1,770	707	7	2,484	580	1,345	4,409
1982	2,273	331	6	2,610	390	1,266	4,266
1983	1,707	349	11	2,067	159	1,085	3,311
1984	1,657	797	34	2,487	63	649	3,200
1985	1,393	671	14	2,078	26	431	2,535
1986	1,750	271	39	2,060	177	1,126	3,363
1987	1,376	369	0	1,745	127	682	2,554
1988	1,905	394	1	2,300	267	1,426	3,993
1989	994	157	0	1,151	2	836	1,989
1990	1,238	126	1	1,365	270	577	2,212
1991	1,587	191	0	1,778	261	1,029	3,068
1992	1,317	342	1	1,660	222	680	2,562
1993	1,048	135	0	1,183	122	588	1,893
1994	2,192	84	1	2,276	227	739	3,242
1995	1,723	99	0	1,823	381	1,532	3,736
1996	776	68	0	844	100	544	2,331
MEAN	1,272	307	7	1,680	205	892	2,820

APPENDIX C. COMMERCIAL SALMON HARVESTS WITHIN THE KODIAK ROAD SYSTEM ZONE, 1980-1996

Appendix C1.-Commercial harvest of salmon from stat areas along the Kodiak road system, 1980-1996.

	1980					1983				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	9	275	15,743	1,798	3	292	330	13,878	519
22 (Womens Bay)	4	2	543	37,055	6,683	29	212	886	46,923	3,940
23 (Middle Bay)	0	4	433	16,644	4,047	2	11	73	8,775	749
24 (Kalsin Bay)	36	14	6,069	211,390	17,076	65	238	766	58,957	4,542
25 (Chiniak Pt)	0	0	75	6,536	3,455	90	479	2,068	17,244	984
21 (Outer)	0	1	837	14,100	2,338	32	282	2,614	48,103	1,071
Chiniak/Monashka Bay Total	40	30	8,232	301,468	35,397	221	1,514	6,737	193,880	11,805
259-41 (Pasagshak/ Saltery)	2	315	1,832	44,674	18,879	140	5,727	2,316	20,175	24,036

	1981					1984				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	15	59	290	34,942	1,542	0	738	1,240	9,843	1,313
22 (Womens Bay)	1	29	1,106	60,684	9,847	3	302	5,282	51,510	3,983
23 (Middle Bay)	0	30	30	22,204	5,905	0	153	2	2,507	115
24 (Kalsin Bay)	58	116	1,366	156,663	19,063	4	48	4,252	18,580	3,455
25 (Chiniak Pt.)	1	200	644	98,895	3,408	0	3	192	9,097	81
21 (Outer)	0	61	1,197	43,532	2,122	10	491	3,580	37,464	1,857
Chiniak/Monashka Bay Total	75	495	4,633	416,920	41,887	17	1,735	14,548	129,001	10,804
259-41 (Pasagshak/ Saltery)	71	21,792	1,048	220,819	83,607	189	16,937	1,485	20,169	13,748

	1982					1985				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	4	370	495	60,272	4,210	1	205	86	292	620
22 (Womens Bay)	6	252	5,245	153,342	9,566	3	75	666	101,537	6,513
23 (Middle Bay)	8	5	121	10,652	8,094	0	12	298	7,915	1,599
24 (Kalsin Bay)	51	45	1,839	100,775	12,302	9	44	332	18,425	6,649
25 (Chiniak Pt.)	4	22	700	26,709	1,458	1	1	3	2,741	2,469
21 (Outer)	0	59	3,105	71,919	858	1	272	1,523	72,499	2,514
Chiniak/Monashka Bay Total	73	753	11,505	423,669	36,488	15	609	2,908	203,409	20,364
259-41 (Pasagshak/ Saltery)	10	2,747	2,787	794	6,802	23	3,508	1,619	2,465	589

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STAT AREA	1986 Chinook	Sockeye	Coho	Pink	Chum	1989 Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	1,522	77	24,694	1,320					
22 (Womens Bay)	3	106	1,065	48,689	6,463	*EXXON VALDEZ* OIL SPILL/				
23 (Middle Bay)	0	1	71	629	2,073	NO COMMERCIAL HARVEST				
24 (Kalsin Bay)	0	3	447	15,333	1,185					
25 (Chiniak Pt.)	0	0	0	0	0					
21 (Outer)	0	214	181	12,955	182					
Chiniak/Monashka Bay Total	3	1,846	1,841	102,300	11,223					
259-41 (Pasagshak/ Saltery)	130	16,203	1,189	1,036	3,217					

STAT AREA	1987 Chinook	Sockeye	Coho	Pink	Chum	1990 Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	3,251	916	30,959	2,492	0	0	0	4,311	30
22 (Womens Bay)	1	256	2,334	136,068	9,463	2	17	1	3,157	1,242
23 (Middle Bay)	1	147	359	52,766	9,311	4	3	1	7,689	2,033
24 (Kalsin Bay)	16	17	3,310	36,654	6,183	11	0	7	10,847	556
25 (Chiniak Pt.)	0	1	235	5,665	139	0	0	0	0	0
21 (Outer)	1	16	6,330	14,555	1,822	10	494	91	5,436	1,822
Chiniak/Monashka Bay Total	19	3,688	13,489	276,657	29,410	27	514	100	31,440	5,683
259-41 (Pasagshak/ Saltery)	202	3,405	9,425	5,962	5,408	410	12,595	46	5,870	2,508

STAT AREA	1988 Chinook	Sockeye	Coho	Pink	Chum	1991 Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	6	244	319	89,121	3,616	0	92	73	350	30
22 (Womens Bay)	6	92	254	118,140	17,290	2	16	15	21,781	1,143
23 (Middle Bay)	13	8	89	26,493	19,966	7	1	4	23,261	4,391
24 (Kalsin Bay)	61	89	1,773	59,461	10,148	49	534	178	68,380	3,671
25 (Chiniak Pt.	23	9	345	38,691	11,973	218	13,153	5,630	86,842	14,291
21 (Outer)	26	289	1,349	87,339	8,687	7	609	607	95,824	3,691
Chiniak/Monashka Bay Total	135	731	4,129	419,245	71,680	283	14,405	6,507	296,438	27,217
259-41 (Pasagshak/ Saltery)	10	2,747	2,787	794	6,802	180	6,787	94	20,143	5,885

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	1992					1995				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	1,625	97	760	196	3	23	336	92,353	249
22 (Womens Bay)	0	0	0	138	17	1	80	224	152,975	5,116
23 (Middle Bay)	0	0	0	567	392	2	79	1,303	233,051	13,121
24 (Kalsin Bay)	0	0	0	57	0	4	67	3,988	190,894	5,407
25 (Chiniak Pt.)	144	48,228	6,604	32,028	15,223	2	584	748	165,292	2,801
21 (Outer)	15	3,086	369	2,021	1,184	2	153	420	153,512	6,901
Chiniak/Monashka Bay Total	159	52,939	7,070	35,571	17,012	14	986	7,019	988,077	33,595
259-41 (Pasagshak/ Saltery)	27	5,900	222	1,992	3,751	106	19,591	927	187,109	13,574

	1993					1996				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	0	0	0	0	0	0	0	0	0
22 (Womens Bay)	1	9	7	2,045	22	0	0	0	0	0
23 (Middle Bay)	1	1	73	116,360	759	0	0	0	0	0
24 (Kalsin Bay)	5	26	40	97,652	325	0	0	0	0	0
25 (Chiniak Pt.)	27	2,864	969	168,770	1,363	6	1,070	94	4,512	2,333
21 (Outer)	11	3,941	544	64,055	525	0	0	0	0	0
Chiniak/Monashka Bay Total	45	6,841	1,633	448,882	2,994	6	1,070	94	4,512	2,333
259-41 (Pasagshak/ Saltery)	281	34,638	714	107,668	599	31	3,646	346	5,139	3,186

	1994				
STAT AREA	Chinook	Sockeye	Coho	Pink	Chum
259-10 (Monashka)	0	19	649	38,793	141
22 (Womens Bay)	0	3	15	956	1,173
23 (Middle Bay)					
24 (Kalsin Bay)	3	14	2	19,534	887
25 (Chiniak Pt.)	263	2,718	2,317	23,332	10,054
21 (Outer)	42	1,134	641	9,172	6,376
Chiniak/Monashka Bay Total	281	3,888	3,624	91,787	18,631
259-41 (Pasagshak/ Saltery)	78	11,903	106	2,530	1,940

APPENDIX D. SUBSISTENCE SALMON HARVESTS WITHIN THE KODIAK ROAD SYSTEM ZONE 1980-1995

Appendix D1.-Subsistence harvests of salmon from locations along the Kodiak road system, 1980-1995.

	1980					1983				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	68	138	11	0	37	11	36	14
Womens Bay	0	30	144	94	2	0	44	106	241	36
Middle Bay	0	0	8	4	52	0	90	43	77	10
Kalsin Bay	2	13	0	18	1	1	27	64	60	12
Buskin River	17	4,279	1,239	751	94	11	5,690	1,470	672	66
Chiniak	13	153	256	332	56	0	40	427	154	37
Roslyn Creek	0	10	137	45	20	0	0	20	8	3
Isthmus Pt.	0	0	21	5	5	0	0	6	0	0 [a]
Cliff Pt.	0	8	29	31	6			21	1	0
Chiniak Bay Total	32	4,529	1,902	1,418	247	12	5,928	2,168	1,249	178
Saltery	0	68	0	27	0			4		5
Pasagshak	0	0	18	23	0	5	365	20	10	
(Permits returned island wide 756 = 61% Permits issued island wide 1,239)						(Permits returned island wide 1,082 = 83% Permits issued island wide 1,307)				

	1981					1984				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	15	5	95	32	0	45	156	42	8
Womens Bay	0	38	20	174	53	0	6	91	83	21
Middle Bay	0	4	1	28	19	0	0	0	0	0
Kalsin Bay	0	4	152	142	8	1	8	445	68	38
Buskin River	1	4,742	860	533	45	26	565	109	29	10
Chiniak	3	368	306	123	16	1	0	249	69	64
Roslyn Creek	0	0	88	15	3	0	0	100	37	10
Isthmus Pt.	0	0	0	0	0	0	0	0	0	0
Cliff Pt.	0	28	0	1	2	1	0	6	0	0
Chiniak Bay Total	4	5,199	1,432	1,111	178	29	624	1,156	328	151
Saltery	0	3	1	1	0	1	3	44	0	3
Pasagshak	0	28	16	21	0	13	491	76	12	0
(Permits returned island wide 733 = 63% Permits issued island wide 1,166)						(Permits returned island wide 1,084 = 87% Permits issued island wide 1,240)				

	1982					1985				
AREA	Chinook	Sockeye	Coho	Pink	Chum	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	0	36	76	31	3	0	67	113	62	2
Womens Bay	0	131	115	192	23	2	767	656	162	34
Middle Bay	0	13	95	110	10	0	1	15	0	0
Kalsin Bay	0	66	279	180	24	0	15	337	153	159
Buskin River	22	6,748	1,754	1,340	87	21	5,326	1,898	728	117
Chiniak	0	25	470	168	46	0	6	89	13	46
Roslyn Creek	0	0	245	37	0	0	10	221	22	48
Isthmus Pt.	0	0	0	0	0	2	0	41	0	4 [a]
Cliff Pt.	0	0	0	0	0	0	3	0	0	0
Chiniak Bay Total	22	7,019	3,034	2,058	193	25	6,195	3,370	1,140	410
Saltery	0	0	42	0	0	1	62	82	35	9
Pasagshak	1	83	17	18	0	3	163	117	2	0
(Permits returned island wide 993 = 78% Permits issued island wide 1,276)						(Permits returned island wide 1,204 = 82% Permits issued island wide 1,476)				

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1986

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	114	138	58	9
Womens Bay	5	0	60	33	0	1
Middle Bay	2	0	0	2	14	0
Kalsin Bay	15	0	29	312	23	35
Buskin River	362	7	5,303	2,585	934	110
Chiniak	7	0	4	90	49	20
Roslyn Creek	8	0	5	188	5	24
Isthmus Pt.	1	0	0	20	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	412	7	5,515	3,368	1,083	199
Saltery		0	199	91	1	0
Pasagshak		6	64	35	5	0

(Permits returned island wide 1,080 = 87%
Permits issued island wide 1,243)

1989

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	8	1	7	83	31	1
Womens Bay	4	0	23	50	0	10
Middle Bay	0	0	0	0	0	0
Kalsin Bay	14	0	4	143	25	7
Buskin River	206	5	3,312	1,251	425	74
Chiniak	5	0	35	70	3	10
Roslyn Creek	10	0	10	262	5	42
Isthmus Pt.	2	0	0	6	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	249	6	3,391	1,859	489	144
Saltery		0	179	0	3	0
Pasagshak		0	78	28	22	1

(Permits returned island wide 687[b]

1987

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	16	0	23	133	109	20
Womens Bay	1	0	0	4	12	7
Middle Bay	23	0	144	33	25	4
Kalsin Bay	18	0	80	379	50	27
Buskin River	300	61	3,375	1,743	541	75
Chiniak	2	0	50	25	2	10
Roslyn Creek	15	2	23	311	78	46
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	1	0	28	0	1	2
Chiniak Bay Total	376	63	3,695	2,633	817	189
Saltery		1	87	67	35	23
Pasagshak		9	82	51	13	15

(Permits returned island wide 969 = 86%
Permits issued island wide 1,124)

1990

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	15	0	20	167	22	22
Womens Bay	8	0	67	36	9	9
Middle Bay	2	0	0	14	0	0
Kalsin Bay	20	1	4	379	61	48
Buskin River	291	8	3,448	1,785	325	91
Chiniak	6	0	112	26	36	3
Roslyn Creek	12	0	11	249	6	16
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	1	0	0	0	10	0
Chiniak Bay Total	355	9	3,662	2,656	469	189
Saltery	9	14	303	7	3	0
Pasagshak	35	3	598	60	11	15

(Permits returned island wide = 1,176[b]

1988

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay	12	0	40	110	88	2
Womens Bay	7	0	0	81	9	25
Middle Bay	0	0	0	0	0	0
Kalsin Bay	13	0	61	209	53	16
Buskin River	220	30	3,099	1,475	313	55
Chiniak	2	0	0	10	0	0
Roslyn Creek	9	1	0	299	44	37
Isthmus Pt.	0	0	0	0	0	0
Cliff Pt.	0	0	0	0	0	0
Chiniak Bay Total	263	31	3,200	2,184	507	135
Saltery		3	145	17	10	2
Pasagshak		0	84	0	11	9

(Permits returned island wide 663 = 60%
Permits issued island wide 1,098)

1991

AREA	Permits Returned	Chinook	Sockeye	Coho	Pink	Chum
Monashka Bay		0	15	85	10	3
Womens Bay		0	30	24	19	14
Middle Bay		0	0	60	3	6
Kalsin Bay		1	6	247	70	57
Buskin River		7	4,301	1,449	208	56
Chiniak		0	0	37	0	0
Roslyn Creek		0	0	160	39	17
Isthmus Pt.		0	0	0	0	0
Cliff Pt.		0	0	10	0	0
Chiniak Bay Total		8	4,352	2,072	349	153
Saltery		2	406	3	27	78
Pasagshak		2	1,645	216	60	10

(Permits returned island wide = 1,145)

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AREA	1992 Permits Returned	1992 Chinook	1992 Sockeye	1992 Coho	1992 Pink	1992 Chum	1995 Permits Returned	1995 Chinook	1995 Sockeye	1995 Coho	1995 Pink	1995 Chum
Monashka Bay		5	31	202	27	0	12	0	2	58	12	6
Womens Bay		0	28	64	18	2	21	0	16	24	9	4
Middle Bay		14	0	0	0	0	2	0	0	2	4	1
Kalsin Bay		0	147	276	21	2	23	1	3	116	59	57
Buskin River		25	3,295	1,499	267	114	437	40	5,547	1,285	394	28
Chiniak		3	48	169	57	16	12	1	40	41	8	2
Roslyn Creek		7	1	236	11	13	8	0	1	120	16	14
Mayflower		0	23	0	0	0	1	0	0	16	0	0
Chiniak Bay Total		54	3,550	2,469	401	147	516	42	5,609	1,662	502	112
Saltery		2	309	0	6	14	21	13	432	73	27	24
Pasagshak		5	1,499	118	34	7	133	14	2,099	65	58	34

(Permits returned island wide = 851 as of 4/19/93)

AREA	1993 Permits Returned	1993 Chinook	1993 Sockeye	1993 Coho	1993 Pink	1993 Chum
Monashka Bay	7	0	12	32	3	12
Womens Bay	3	0	0	4	3	10
Middle Bay	1	0	0	3	0	0
Kalsin Bay	9	4	0	82	17	0
Buskin River	277	56	4,745	1,719	375	51
Chiniak	4	2	0	49	51	0
Roslyn Creek	10	9	1	148	4	17
Mayflower	2	0	0	25	0	6
Chiniak Bay Total	313	71	4,758	2,062	453	96
Saltery	17	1	328	33	17	0
Pasagshak	85	2	2,253	276	115	15

AREA	1994 Permits Returned	1994 Chinook	1994 Sockeye	1994 Coho	1994 Pink	1994 Chum
Monashka Bay	29	0	12	238	3	0
Womens Bay	5	0	16	26	0	0
Middle Bay	2	0	0	0	6	0
Kalsin Bay	32	4	2	225	55	35
Buskin River	507	30	4,899	2,167	414	35
Chiniak	25	40	12	180	3	3
Roslyn Creek	0	0	0	0	0	0
Mayflower	8	0	0	54	3	8
Chiniak Bay Total	608	74	4,941	2,890	484	81
Saltery	30	2	392	110	11	18
Pasagshak	98	7	1,554	112	73	25

[a] Fishing occurred at Mayflower not Isthmus Pt.

[b] Beginning in 1989, 2,900 permits were mailed out to potential subsistence fishermen.

APPENDIX E. COHO SALMON ESCAPEMENT COUNTS WITHIN THE KODIAK ROAD SYSTEM ZONE, 1980-1996

Appendix E1.-Coho salmon escapements into streams along the Kodiak road system, 1980-1996.

Year	Monashka		Pillar		Buskin	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	72	20-Oct	68	20-Oct	1,021	20-Oct
1981	57	28-Oct	33	28-Oct	919	28-Oct
1982	-	-	-	-	500 a	27-Aug
					750 a	7-Oct
1983	24	20-Oct	15	20-Oct	243	26-Oct
1984	-	-	-	-	1,905	19-Sep
1985	135	11-Sep	140	28-Oct	9,474 b	26-Oct
1986	172	17-Oct	44	17-Oct	9,589 b	2-Oct
					1,985	15-Oct
					1,493	30-Oct
1987	12	12-Nov	102	12-Nov	11,103 b	1-Oct
					559	29-Oct
1988	-	-	-	-	6,182 b	24-Sep
					600	25-Sep
1989	150 a	13-Sep	25	30-Aug	9,930 b	2-Oct
1990	53	23-Oct	45	23-Oct	6,222 b	26-Sep
					734	20-Oct
					1,604	31-Oct
1991	55	18-Sep	70	18-Sep	8,929 b	28-Sep
1992	2		300		6,535 b	7-Oct
1993	145	5-Oct	69	3-Oct	6,813 b	30-Sep
1994	1,749	27-Sep	199	28-Sep	8,146	29-Sep
1995					8,694	1-Oct
1996	62	7-Oct	27	7-Oct	8,439	1-Oct

Year	Sargent		Russian		Salonie	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	72	20-Oct	68	20-Oct	1,021	20-Oct
1981	44	26-Oct	47	26-Oct	919	28-Oct
1982	130	4-Nov	87	28-Oct	388	26-Oct
1983	16	24-Oct	23	24-Oct	127	24-Oct
1984	61	5-Nov	150 a	11-Sep	300 a	11-Sep
1985	87	28-Oct	358	28-Oct	30 a	12-Sep
					189	31-Oct
					67	25-Oct
1986	41	26-Oct	109	26-Oct	29	3-Sep
					179	12-Sep
					152	25-Sep
1987	24	12-Nov	37	21-Nov	154	15-Oct
					315	18-Oct
					49	19-Nov
1988	0	23-Aug	0	23-Aug	0	23-Aug
1989	0	12-Sep	0	12-Sep	0	12-Sep
1990	60	28-Oct	16	21-Oct	142	21-Oct
					187	4-Nov
1991	-		-		-	
1992	0 a	3-Sep	50 a	3-Sep	98	22-Oct
1993	83	12-Oct	133	13-Oct	274	18-Oct
					253	31-Oct
1994					226	22-Sep
1995					521	12-Oct
1996					88	9-Oct

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	American		Olds		Roslyn	
Year	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	903	30-Oct	780	28-Oct	628	27-Nov
1981	1,130 a	13-Oct	800 a	13-Oct	360 a	13-Oct
	627	30-Oct	434	29-Oct	314	22-Oct
1982	360 a	7-Oct	645 a	7-Oct	240 a	7-Oct
	266	28-Oct	1,375	27-Oct	525	25-Oct
1983	420 a	22-Sep	800 a	22-Sep	49	21-Oct
	114	25-Oct	173	25-Oct		
1984	350 a	11-Sep	4,500 a	22-Aug	76	6-Nov
1985	65 a	20-Sep	900 a	20-Sep	150 a	5-Sep
	439	30-Oct	1,648	25-Sep	78 a	20-Sep
					93	24-Sep
					189	30-Oct
1986	99	5-Sep	1,178	5-Sep	358	4-Sep
	201	15-Sep	1,849	11-Sep	342	10-Sep
	221	24-Oct	1,549	17-Oct	370	19-Sep
			1,164	28-Oct	306	25-Sep
1987	555	19-Oct	842	18-Oct	280	14-Sep
	453	14-Nov	683	14-Nov	0	18-Oct
					47	9-Nov
1988			0	23-Aug		
1989	2,500 a	13-Sep	800 a	13-Sep	222	16-Sep
			769	28-Oct	335	25-Oct
1990	20	6-Sep	15	6-Sep	40	6-Sep
	419	19-Oct	1,706	17-Oct	648	16-Oct
	290	27-Oct	1,014	3-Nov	676	30-Oct
	316	6-Nov				
1991	-	-	900 a	6-Sep	50 a	22-Aug
			570	9-Sep	882	4-Oct
1992	600 a	21-Sep	950 a	21-Sep	100 a	3-Sep
	181	20-Oct	320	18-Oct	70	21-Oct
1993	412	20-Oct	525	5-Oct	148	15-Oct
			474	31-Oct	137	22-Oct
1994	194	6-Oct	243	14-Oct	130	21-Oct
			395	21-Oct		
1995	4,000 a	8-Sep	7,500 a	8-Sep	322	12-Oct
	169	10-Oct	2,642	11-Oct		
1996	69	4-Oct	2,200	4-Oct	6	9-Oct
	62	9-Oct	2,086	14-Oct		

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Appendix E1.-Page 3 of 4.

Year	Chiniak		Pasagshak		Saltery	
	Number of fish	Date	Number of fish	Date	Number of fish	Date
1980	32	8-Nov	850	23-Aug	212 a	7-Nov
			1,330	20-Oct		
			1,330	20-Nov		
1981	170	2-Nov	320 a	21-Oct	720 a	21-Oct
					959	5-Nov
1982	155	25-Oct	175	27-Oct	400 a	7-Oct
					2,176	2-Nov
1983	25	21-Oct	1,500 a	23-Aug	700 a	9-Sep
			1,920	28-Oct		
1984	76	6-Nov	1,540	1-Nov	2,100 a	10-Sep
					520 a	6-Oct
1985	66	24-Sep	400 a	6-Sep	4,022 b	28-Sep
	86	28-Oct	3,000 a	29-Oct		
1986	48	20-Oct	1,998	14-Oct	11,009 b	12-Sep
			3,524	22-Oct		
			3,571	29-Oct		
1987	15	9-Nov	1,023	18-Oct	11,376 b	1-Oct
			2,519	13-Nov		
1988			2,000 a	23-Aug	4,702 b	12-Sep
1989			800 a	12-Sep	5,332 b	26-Sep
			1,800 a	13-Sep		
1990	48	5-Nov	303	15-Oct	2,847 b	17-Sep
			908	28-Oct	268	29-Oct
			2,178	15-Nov		
					187	4-Nov
1991	-		0	5-Oct	747 b	4-Sep
1992	-		3,000 a	3-Sep	1,000 a	21-Sep
			5	19-Oct		
1993			612	25-Oct	3,500 a	13-Sep
			1,337	6-Nov		
1994	-		-		2,173 b	22-Sep
1995	-		-		6,500 a	8-Sep
1996			48	10-Oct		
			1,973	5-Nov		
			789	18-Nov		

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Year	Miam		Hurst	
	Number of fish	Date	Number of fish	Date
1980	200 a	23-Aug	218	31-Oct
1981	300 a	22-Aug		
	740 a	21-Oct		
1982	220	7-Oct	266	2-Nov
1983	500 a	31-Aug	48	15-Nov
	20 a	7-Sep		
1984	1,000 a	10-Sep	50 a	10-Sep
	1,050 a	16-Oct	339	8-Nov
1985	160	6-Sep	55 a	20-Sep
	1,060 a	20-Sep		
	1,500 a	4-Oct		
1986			427	28-Oct
1988	250 a	30-Aug		
1989	1,400 a	13-Sep	0 a	12-Sep
1990			372	29-Oct
1991	300 a	30-Aug		
	3,500 a	6-Sep		
1992	1,300 a	21-Sep		
1993	4,700 a	13-Sep		
1994	-	-		
1995	2,500 a	8-Sep		
1996				

Note: All unmarked estimates were documented on foot surveys.

[a] Aerial survey estimates.

[b] Weir counts.

APPENDIX F. PINK, SOCKEYE AND CHUM SALMON ESCAPEMENT COUNTS WITHIN THE KODIAK ROAD SYSTEM ZONE, 1980-1996

Appendix F1.-Pink, sockeye, and chum salmon peak escapement counts for streams along the Kodiak road systems, 1980-1996.

Year	Monashka		Pillar		Buskin			
	Pink	Date	Pink	Date	Pink	Date	Sockeye	Date
1980	3,300	25-Aug	30	25-Aug	95,000	20-Aug	3,814	15-Aug
1981	1,300	26-Aug	400	26-Aug	70,000	28-Aug	7,846	14-Aug
1982	2,800	1-Sep	277	17-Sep	120,000	27-Aug	3,600	27-Aug
1983	1,100	31-Aug	420	31-Aug	53,000	23-Aug	4,669	30-Aug
1984	4,600	3-Aug	500	31-Jul	100,000	11-Sep	4,875	11-Sep
1985	8,500	5-Sep	5,040	11-Sep	171,028 a		18,010 a	
1986	5,500	9-Sep	6,215	9-Sep	98,958		8,939	
1987	225	21-Jul	300	17-Aug	27,892		12,690	
1988	2,000	15-Aug	1,000	15-Aug	203,648		12,144	
1989	8,000	30-Aug	42,100	27-Aug	159,123		17,853	
1990	2,700	14-Aug	11,580	20-Aug	42,889		10,528	
1991	7,800	30-Aug	6,000	30-Aug	37,736		9,794	
1992	7,700	7-Sep	11,900	7-Sep	25,141		9,711	
1993	3,600	17-Aug	6,200	17-Aug	53,484		9,526	
1994	7,000	2-Sep	17,000	2-Sep	128,000		11,783	
1995	7,000	16-Aug	20,000	16-Aug	72,826		15,520	
1996	4,850	15-Aug	8,000	15-Aug	50,550		9,661	

	Sargent				Russian				Salonie			
	Pink	Date	Chum	Date	Pink	Date	Chum	Date	Pink	Date	Chum	Date
1980	2,800	20-Aug			8,000	20-Aug	4,000	20-Aug	3,000	20-Aug	1,400	20-Aug
1981	1,400	22-Aug			5,600	22-Aug	500	22-Aug	10,000	22-Aug	200	22-Aug
1982	10,000	27-Aug	1,500	27-Aug	8,000	11-Aug	2,000	11-Aug	12,000	27-Aug	1,000	11-Aug
1983	300	11-Aug	50	11-Aug	2,000	23-Aug	500	23-Aug	5,500	23-Aug	2,000	23-Aug
1984	1,800	11-Sep	100	11-Sep	6,000	10-Aug	4,800	11-Sep	2,800	11-Sep	1,100	11-Sep
1985	4,000	5-Sep	2,500	5-Sep	10,400	5-Sep	7,600	5-Sep	20,400	5-Sep	10,000	20-Sep
1986	3,500	18-Aug			14,000	18-Aug	4,000	18-Aug	18,000	18-Aug	5,000	18-Aug
1987	300	25-Aug			18,200	25-Aug	10,000	15-Sep	1,000	25-Aug		
1988	19,000	23-Aug			12,000	23-Aug	8,000	23-Aug	15,000	23-Aug	500	23-Aug
1989	22,000	12-Sep			36,500	12-Sep	1,800	12-Sep	113,000	12-Sep		
1990	4,900	18-Aug			4,180	18-Aug	200	18-Aug	4,140	18-Aug		
1991	250	2-Aug			900	12-Aug			9,000	22-Aug		
1992	1,240	3-Sep			2,700	3-Sep	2,365	3-Sep				
1993	14,500	9-Aug			17,500	9-Aug	700	9-Aug	52,500	9-Aug		
1994	10,000	5-Aug			8,500	2-Aug			300	22-Sep		
1995	13,500	18-Aug			140,000	18-Aug			194,500	18-Aug	300	18-Aug
1996	3,000	8-Aug			9,000	8-Aug			17,000	8-Aug		

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	American				Olds				Roslyn			
	Pink	Date	Chum	Date	Pink	Date	Chum	Date	Pink	Date	Chum	Date
1980	47,000	23-Aug	4,000	1-Sep	67,700	8-Aug	8,500	23-Aug	52,000	23-Aug		
1981	45,000	22-Aug	2,500	22-Aug	40,000	22-Aug	500	22-Aug	1,500	25-Jul		
1982	36,000	27-Aug	3,000	11-Aug	60,000	27-Aug	2,500	27-Aug	30,000	27-Aug		
1983	64,000	7-Sep	10,000	7-Sep	27,000	23-Aug	11,000	7-Sep	2,800	7-Sep		
1984	30,000	28-Aug	8,400	11-Sep	31,500	22-Aug	15,000	28-Aug	17,000	31-Aug		
1985	140,000	20-Sep	10,400	5-Sep	65,000	5-Sep	8,000	22-Aug	7,800	5-Sep		
1986	21,000	18-Aug	4,000	18-Aug	52,000	16-Aug	3,000	16-Aug	27,000	18-Aug		
1987	112,000	25-Aug	800	12-Aug	48,100	25-Aug	2,600	12-Aug	12,000	25-Aug		
1988	500	25-Jul			90,000	23-Aug	15,000	23-Aug	42,000	23-Aug		
1989	126,000	25-Sep	11,000	25-Sep	46,000	30-Aug	1,400	13-Sep	39,400	30-Aug	200	30-Aug
1990	22,000	21-Aug	8,000	13-Aug	21,000	13-Aug	1,400	18-Aug	39,450	18-Aug		
1991	49,000	22-Aug	12,000	22-Aug	22,500	12-Aug	2,500	2-Aug	23,000	22-Aug		
1992	17,900	3-Sep	4,500	3-Sep	24,500	3-Sep	3,000	8-Aug	9,400	8-Aug	123	14-Aug
1993	52,700	10-Sep	2,000	10-Sep	58,000	5-Aug	7,000	17-Aug	21,000	5-Aug	700	5-Aug
1994	95,000	11-Aug	5,100	11-Aug	78,500	11-Aug	5,000	11-Aug	24,000	9-Aug		
1995	142,000	8-Sep	8,000	8-Sep	130,000	8-Sep	1,500	31-Jul	30,500	18-Aug		
1996	33,000	15-Aug	2,500	15-Aug	11,000	15-Aug	600	31-Jul	15,500	8-Aug		

	Chiniak		Pasagshak				Saltery					
	Pink	Date	Pink	Date	Sockeye	Date	Pink	Date	Sockeye	Date	Chum	Date
1980	5,500	20-Aug			3,484	19-Aug	38,000	23-Aug	31,600	3-Aug		
1981	650	27-Jul	2,000	4-Aug	2,759	26-Aug	57,000	4-Aug	43,300	4-Aug	7,000	4-Aug
1982	4,500	25-Aug			5,400	27-Aug	25,000	27-Aug	28,000	26-Jul	8,000	31-Aug
1983	3,000	23-Aug	400	31-Jul	3,458	2-Sep	28,000	9-Sep	46,400	10-Aug	5,000	23-Aug
1984	11,000	31-Aug	3,500	27-Aug	3,700	13-Aug	28,000	28-Aug	120,000	20-Jul	10,000	3-Aug
1985	9,700	6-Sep	11,000	6-Aug	1,700	4-Sep	7,107 b		1,890 b		43 b	
1986	7,000	18-Aug			3,200	18-Aug	23,011		38,314		203	
1987	9,400	10-Aug	2,000	12-Aug	14,000	12-Aug	39,687		22,705		121	
1988	-		2,000	23-Aug	20,000	23-Aug	7,646		25,654		28	
1989	-		2,000	13-Sep	14,300	13-Sep	214,541		30,937		14	
1990	22,550	18-Aug			4,680	28-Sep	313		29,541		9	
1991	10,000	2-Aug	2,000	6-Sep	25,000	30-Aug	33,812		52,577		18	
1992	4,500	3-Sep	500	3-Sep	3,590	3-Sep	5,800		44,450		250	
1993	74,000	5-Aug	300	15-Jul	16,000	15-Jul	92,078		77,186		5,000	13-Sep
1994	24,000	9-Aug	500	1-Aug	2,400	1-Aug	16,664		58,975		500	8-Aug
1995	28,000	18-Aug	4,600	4-Aug	12,500	30-Jul	85,000		43,859		103	8-Aug
1996	30,000	8-Aug			21,500	26-Jul	45,000		35,488			

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	Miam				Hurst	
	Pink	Date	Sockeye	Date	Pink	Date
1980	16,000	3-Aug	300	13-Jul	10,000	8-Aug
1981	12,280	22-Aug			6,000	22-Aug
1982	20,000	17-Aug	200	27-Aug	5,000	27-Aug
1983	16,000	31-Aug	800	10-Aug	3,500	23-Aug
1984	21,000	27-Aug	1,500	29-Jul	1,000	27-Aug
1985	39,800	6-Aug			1,500	27-Aug
1986	19,000	18-Aug			9,000	18-Aug
1987	19,800	12-Aug	700	25-Aug	11,100	25-Aug
1988	8,000	30-Aug	1,200	30-Aug	5,600	30-Aug
1989	40,000	11-Sep	950	12-Sep	96,000	26-Aug
1990	9,970	14-Aug	1,900	13-Aug	6,700	20-Aug
1991	43,000	6-Sep	2,300	30-Aug	15,450	22-Aug
1992	4,400	3-Sep	270	5-Aug	3,800	8-Aug
1993	25,000	23-Aug	1,200	23-Aug		
1994	11,400	11-Aug	800	8-Aug		
1995	60,300	9-Sep	2,000	27-Jul	31,500	6-Aug
1996	1,600	15-Aug	3,200	31-Jul		

Note: These figures represent the largest aerial survey count of the year and not an estimate of total escapement. Dates for surveys are provided because during some years a stream may only be flown once, possibly before or after the run has started. In these cases the dates will show that the low peak count was due to the date it was flown and not necessarily the low abundance of fish.

[a] Aerial surveys unless otherwise noted.

[b] 1985-1990 are weir counts. Does not include fish spawning below the weir.

APPENDIX G. TIME OF ENTRY TABLES FOR:

BUSKIN RIVER SOCKEYE SALMON,
BUSKIN RIVER PINK SALMON,
BUSKIN RIVER COHO SALMON,
KARLUK RIVER CHINOOK SALMON,
AYAKULIK RIVER CHINOOK SALMON,
CHIGNIK RIVER CHINOOK SALMON

Appendix G1.-Immigration of sockeye salmon through the Buskin River weir, 1987-1996.

	1987		1988		1989		1990[a]		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	146	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-May	151	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May	156	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-May	156	1	11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-May	156	1	12	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
25-May	156	1	29	0	1	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0
26-May	156	1	36	0	11	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0
27-May	164	1	67	1	25	0	1	0	20	0	7	0	0	0	0	0	34	0	0	0	0
28-May	166	1	90	1	65	0	16	0	35	0	7	0	0	0	0	0	34	0	0	0	0
29-May	166	1	99	1	72	0	16	0	35	0	7	0	0	0	0	0	34	0	99	1	0
30-May	180	1	100	1	106	1	16	0	154	2	7	0	18	0	0	0	34	0	213	2	1
31-May	194	2	101	1	133	1	17	0	154	2	7	0	69	1	0	0	34	0	232	2	1
1-Jun	195	2	101	1	147	1	17	0	165	2	11	0	87	1	0	0	36	0	334	3	1
2-Jun	195	2	102	1	197	1	17	0	321	3	11	0	297	3	5	0	42	0	596	6	2
3-Jun	196	2	236	2	297	2	28	0	902	9	12	0	530	6	188	1	283	2	866	8	3
4-Jun	196	2	301	2	447	3	735	7	912	9	12	0	922	11	440	3	1023	7	1127	11	5
5-Jun	196	2	486	4	623	3	983	9	912	9	121	1	1,370	16	595	5	2,085	14	1,393	14	8
6-Jun	199	2	655	5	863	5	1,918	18	1,218	12	142	1	1,514	17	750	6	2,782	18	1,642	16	10
7-Jun	414	3	669	6	1,258	7	2,049	19	1,265	13	601	6	1,558	18	1,399	11	3,038	20	2,077	20	12
8-Jun	655	5	819	7	2,040	11	2,492	24	1,380	14	623	6	2,160	25	1,704	13	3,708	24	2,429	24	15
9-Jun	735	6	880	7	2,655	15	2,829	27	1,478	15	760	8	2,394	27	1,822	14	4,526	29	2,615	25	17
10-Jun	1,335	11	890	7	2,861	16	2,937	28	1,844	19	1,722	18	2,577	29	1,949	15	4,698	30	2,879	28	20
11-Jun	2,935	23	909	7	3,752	21	3,178	30	2,469	25	1,758	18	2,885	33	2,056	16	5,342	35	3,975	39	25
12-Jun	4,136	33	909	7	3,937	22	3,527	34	2,710	28	2,002	21	3,377	38	2,406	18	5,848	38	4,446	43	28
13-Jun	4,936	39	931	8	4,153	23	3,999	38	3,431	35	2,515	26	3,878	44	2,758	21	6,819	44	4,703	46	32
14-Jun	5,336	42	1,019	8	4,627	26	4,335	41	4,135	42	2,531	26	3,944	45	3,094	24	7,537	49	4,826	47	35
15-Jun	5,389	42	1,037	9	4,934	28	4,631	44	4,730	48	2,876	29	3,965	45	3,366	26	8,590	56	4,909	48	37
16-Jun	5,700	45	1,540	13	5,537	31	4,860	46	4,744	48	2,963	30	4,257	49	3,835	29	8,740	57	4,995	49	40
17-Jun	6,222	49	4,033	33	6,550	37	5,140	49	4,794	49	2,988	31	4,610	53	3,956	30	9,312	60	5,147	50	44
18-Jun	6,482	51	4,171	34	6,770	38	5,252	50	5,025	51	3,251	33	4,809	55	4,343	33	10,013	65	6,001	58	47

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	1987		1988		1989		1990 [a]		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jun	6,579	52	4,260	35	6,779	38	5,504	52	5,255	54	3,599	37	5,186	59	4,955	38	10,590	69	6,503	63	50
20-Jun	6,788	53	4,344	36	7,000	39	5,648	54	5,485	56	3,891	40	5,344	61	5,745	44	11,843	77	6,602	64	52
21-Jun	7,126	56	4,708	39	7,500	42	5,907	56	5,715	58	4,042	41	5,603	64	6,875	52	12,079	78	6,673	65	55
22-Jun	7,313	58	4,924	41	7,732	43	6,056	58	5,856	60	4,380	45	5,750	66	7,242	55	12,286	80	6,724	66	57
23-Jun	7,912	62	5,104	42	7,900	44	6,292	60	5,914	60	5,230	54	5,828	66	7,599	58	12,398	80	6,781	66	59
24-Jun	8,435	66	5,181	43	8,304	47	6,444	61	6,080	62	5,264	54	6,081	69	8,282	63	12,933	84	7,075	69	62
25-Jun	8,884	70	5,250	43	8,784	49	6,852	65	6,194	63	5,466	56	6,257	71	8,415	64	12,989	84	7,075	69	64
26-Jun	9,257	73	5,564	46	9,184	51	7,010	67	6,368	65	5,595	57	6,350	72	8,643	66	12,989	84	7,126	69	65
27-Jun	9,556	75	5,750	47	9,490	53	7,050	67	6,413	65	5,927	61	6,526	74	8,874	68	13,044	85	7,154	70	67
28-Jun	9,781	77	5,758	47	9,830	55	7,122	68	6,473	66	6,750	69	6,615	75	9,035	69	13,113	85	7,172	70	68
29-Jun	9,930	78	5,945	49	10,173	57	7,125	68	6,510	66	6,841	70	6,633	76	9,164	70	13,322	86	7,310	71	69
30-Jun	10,005	79	5,946	49	10,436	58	7,559	72	6,638	68	6,887	71	6,648	76	9,187	70	13,583	88	8,082	79	71
1-Jul	10,008	79	5,956	49	10,839	61	7,621	72	6,692	68	6,897	71	6,776	77	10,001	76	13,594	88	8,140	79	72
2-Jul	10,045	79	5,960	49	11,123	62	7,783	74	7,040	72	7,014	72	6,814	78	10,037	77	13,629	88	8,145	79	73
3-Jul	10,150	80	6,000	49	11,277	63	7,893	75	7,184	73	7,042	72	6,855	78	10,341	79	13,701	89	8,151	79	74
4-Jul	10,154	80	6,010	49	11,451	64	7,909	75	7,265	74	7,126	73	6,860	78	10,415	79	13,866	90	8,193	80	74
5-Jul	10,156	80	6,014	50	11,638	65	7,909	75	7,342	75	7,168	73	6,952	79	10,547	80	13,879	90	8,472	83	75
6-Jul	10,159	80	7,269	60	11,720	66	7,913	75	7,402	76	7,205	74	6,953	79	10,648	81	14,067	91	8,793	86	77
7-Jul	10,185	80	7,346	60	11,874	67	7,933	75	7,480	76	7,236	74	6,964	79	10,663	81	14,141	92	8,793	86	77
8-Jul	10,188	80	7,353	61	12,096	68	7,963	76	7,503	77	7,248	74	6,996	80	10,680	81	14,167	92	8,893	87	77
9-Jul	10,189	80	7,378	61	12,521	70	8,201	78	7,599	78	7,319	75	7,016	80	10,718	82	14,175	92	8,939	87	78
10-Jul	10,251	81	7,422	61	12,706	71	8,205	78	7,614	78	7,345	75	7,019	80	10,724	82	14,187	92	8,946	87	79
11-Jul	10,292	81	7,521	62	12,790	72	8,205	78	7,680	78	7,374	76	7,084	81	11,044	84	14,202	92	8,948	87	79
12-Jul	10,300	81	7,617	63	12,841	72	8,205	78	7,688	78	7,414	76	7,151	82	11,151	85	14,260	92	8,958	87	79
13-Jul	10,307	81	8,948	74	13,032	73	8,206	78	7,693	79	7,466	77	7,158	82	11,250	86	14,281	93	8,971	87	81
14-Jul	10,320	81	8,952	74	13,062	73	8,341	79	7,707	79	7,527	77	7,203	82	11,275	86	14,283	93	8,973	87	81
15-Jul	10,437	82	8,976	74	13,676	77	8,381	80	7,748	79	7,585	78	7,315	83	11,276	86	14,325	93	8,973	87	82
16-Jul	10,456	82	9,007	74	13,931	78	8,413	80	7,825	80	7,597	78	7,337	84	11,299	86	14,603	95	8,973	87	82
17-Jul	10,481	83	9,038	74	14,041	79	8,653	82	7,831	80	7,598	78	7,583	86	11,405	87	14,634	95	9,016	88	83
18-Jul	10,489	83	9,048	75	14,259	80	8,653	82	7,956	81	7,684	79	7,628	87	11,483	88	14,637	95	9,106	89	84

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	1987		1988		1989		1990 [a]		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Jul	10,500	83	10,285	85	14,423	81	8,668	82	7,961	81	7,845	80	7,630	87	11,597	88	14,641	95	9,106	89	85
20-Jul	10,514	83	10,425	86	14,499	81	8,718	83	7,977	81	7,874	81	7,630	87	11,599	88	14,641	95	9,144	89	85
21-Jul	10,526	83	10,440	86	14,797	83	8,803	84	8,004	82	7,907	81	7,630	87	11,600	88	14,642	95	9,264	90	86
22-Jul	10,575	83	10,457	86	14,898	83	8,899	85	8,033	82	7,938	81	7,642	87	11,602	89	14,642	95	9,266	90	86
23-Jul	10,588	83	10,468	86	15,168	85	8,917	85	8,164	83	8,019	82	7,653	87	11,605	89	14,642	95	9,270	90	87
24-Jul	10,604	84	10,478	86	15,420	86	8,935	85	8,227	84	8,204	84	7,656	87	11,605	89	14,645	95	9,463	92	87
25-Jul	10,653	84	10,528	87	15,531	87	8,954	85	8,254	84	8,253	85	7,708	88	11,605	89	14,671	95	9,468	92	88
26-Jul	10,850	86	10,648	88	15,650	88	8,957	85	8,307	85	8,268	85	7,720	88	11,605	89	14,673	95	9,475	92	88
27-Jul	10,887	86	10,713	88	15,692	88	9,008	86	8,360	85	8,315 [b]	85	7,721	88	11,606	89	14,674	95	9,476	92	88
28-Jul	10,937	86	10,756	89	15,789	88	9,299	88	8,413	86	8,362	86	7,741	88	11,607	89	14,674	95	9,477	92	89
29-Jul	11,115	88	11,520	95	15,911	89	9,386	89	8,466	86	8,409	86	7,807	89	11,679 [c]	89	14,674	95	9,477	92	90
30-Jul	11,157	88	11,543	95	16,211	91	9,424	90	8,519	87	8,456	87	7,848 [d]	89	11,751	90	14,682	95	9,514 [e]	93	90
31-Jul	11,197	88	11,554	95	16,326	91	9,475	90	8,572	88	8,503	87	7,889	90	11,823	90	14,687	95	9,551	93	91
1-Aug	11,267	89	11,591	95	16,472	92	9,755	93	8,625	88	8,550	88	7,930	90	11,895	91	14,729 [f]	96	9,588	93	91
2-Aug	11,300	89	11,640	96	16,521	93	9,812	93	8,678	89	8,597	88	7,971	91	11,967	91	14,771	96	9,625	94	92
3-Aug	11,339	89	11,686	96	16,743	94	9,973	95	8,731	89	8,644	89	8,012	91	12,039	92	14,813	96	9,662	94	93
4-Aug	11,393	90	11,744	97	16,766	94	10,033	95	8,784	90	8,691	89	8,053	92	12,111	92	14,855	96	9,699	95	93
5-Aug	11,412	90	11,758	97	16,868	94	10,082	96	8,837	90	8,738	90	8,094	92	12,183	93	14,897	97	9,736	95	93
6-Aug	11,428	90	11,796	97	16,940	95	10,137	96	8,890	91	8,785	90	8,135	93	12,255	93	14,939	97	9,773	95	94
7-Aug	11,443	90	11,850	98	17,029	95	10,196	97	8,942	91	8,832	91	8,176	93	12,327	94	14,981	97	9,810	96	94
8-Aug	11,458	90	11,869	98	17,154	96	10,249	97	8,994	92	8,879	91	8,217	94	12,399	95	15,023	97	9,847	96	95
9-Aug	11,514	91	11,883	98	17,219	96	10,290	98	9,046	92	8,926	91	8,258	94	12,471	95	15,065	98	9,884	96	95
10-Aug	11,578	91	11,905	98	17,262	97	10,326	98	9,098	93	8,973	92	8,299	95	12,543	96	15,107	98	9,921	97	95
11-Aug	11,759	93	11,911	98	17,317	97	10,381	99	9,150	93	9,020	92	8,340	95	12,615	96	15,149	98	9,958	97	96
12-Aug	11,819	93	11,926	98	17,389	97	10,414	99	9,202	94	9,067	93	8,381	96	12,687	97	15,191	98	9,995	97	96
13-Aug	11,837	93	11,937	98	17,421	98	10,433	99	9,254	94	9,114	93	8,422	96	12,759	97	15,233	99	10,032	98	97
14-Aug	11,847	93	11,939	98	17,470	98	10,452	99	9,306	95	9,161	94	8,463	96	12,831	98	15,273 [f]	99	10,076 [e]	98	97
15-Aug	11,858	93	11,946	98	17,519	98	10,468	99	9,358	96	9,208	94	8,504	97	12,903	98	15,282	99	10,092	98	97
16-Aug	11,865	93	11,962	99	17,663	99	10,479	99	9,410	96	9,255	95	8,545	97	12,970 [c]	99	15,282	99	10,110	99	97
17-Aug	11,871	94	12,092	99	17,676	99	10,482	99	9,462	97	9,302	95	8,586	98	12,970	99	15,292	99	10,114	99	98
18-Aug	11,899	94	12,101	99	17,704	99	10,482	99	9,514	97	9,349	96	8,627	98	12,972	99	15,309	99	10,126	99	98

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	1987		1988		1989		1990 [h]		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
19-Aug	11,925	94	12,105	99	17,726	99	10,485	99	9,566	98	9,396	96	8,668	99	12,977	99	15,322	99	10,139	99	98
20-Aug	11,950	94	12,110	99	17,733	99	10,486	99	9,618	98	9,443	97	8,717 [d]	99	12,981	99	15,333	99	10,154	99	98
21-Aug	11,968	94	12,127	99	17,741	99	10,486	99	9,670	99	9,490	97	8,717	99	12,987	99	15,351	99	10,195	99	98
22-Aug	11,984	94	12,133	99	17,747	99	10,486	99	9,722	99	9,537	98	8,718	99	12,988	99	15,366	99	10,217	99	99
23-Aug	12,024	95	12,133	99	17,749	99	10,487	99	9,730	99	9,584	98	8,718	99	12,995	99	15,368	99	10,225	99	99
24-Aug	12,084	95	12,135	99	17,749	99	10,487	99	9,732	99	9,631	99	8,718	99	12,997	99	15,377	99	10,227	99	99
25-Aug	12,106	95	12,135	99	17,775	99	10,487	99	9,750	99	9,688 [b]	99	8,725 [g]	99	13,002	99	15,386	99	10,234	99	99
26-Aug	12,146	96	12,140	99	17,782	99	10,487	99	9,754	99	9,693	99	8,732	99	13,006	99	15,391	99	10,235	99	99
27-Aug	12,161	96	12,140	99	17,785	99	10,487	99	9,761	99	9,694	99	8,739	99	13,009	99	15,395	99	10,236	99	99
28-Aug	12,171	96	12,140	99	17,809	99	10,487	99	9,768	99	9,695	99	8,746	99	13,009	99	15,403	99	10,238	99	99
29-Aug	12,181	96	12,140	99	17,810	99	10,487	99	9,769	99	9,697	99	8,753	99	13,009	99	15,404	99	10,239	99	99
30-Aug	12,208	96	12,141	99	17,818	99	10,487	99	9,771	99	9,701	99	8,760	99	13,014	99	15,407	99	10,245	99	99
31-Aug	12,214	96	12,142	99	17,820	99	10,494	99	9,771	99	9,704	99	8,765 [g]	99	13,018	99	15,408	99	10,247	99	99
Season Total	12,690		12,144		17,853		10,528		9,794		9,759		8,772		13,109		15,423		10,260		
Ending Date	30-Sep		30-Sep		2-Oct		30-Sep		30-Sep		7-Oct		27-Sep		29-Sep		16-Sep		24-Sep		

[a] Beginning in 1990 the weir was moved to the outlet at Buskin Lake for June and July. Fish immigrating to tributary lakes (Genevieve and Louise) are no longer counted.

[b] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (27 July-25 August).

[c] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (29 July-16 August).

[d] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (30 July-20 August).

[e] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (30 July-14 August).

[f] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (1 August-14 August).

[g] estimate based on average percent return 1985-1991 divided equally for the days the weir was out (25 August-31 August).

Appendix G2.-Immigration of pink salmon through the Buskin River weir, 1985-1990.

Date	1985		1986		1987		1988		1989		1990		1985-90
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
20-Jul	1,885	1	742	1	108	0	215	0	600	0	44	0	0
21-Jul	2,696	2	946	1	143	1	315	0	884	1	536	1	1
22-Jul	3,507	2	1,174	1	247	1	562	0	1041	1	605	1	1
23-Jul	4,341	3	1,505	2	277	1	795	0	1383	1	626	2	1
24-Jul	6,259	4	1,612	2	323	1	1,110	1	2033	1	678	2	2
25-Jul	7,084	5	1,971	2	477	2	1,754	1	2648	2	743	2	2
26-Jul	8,591	6	2,302	2	604	2	2,539	1	4615	3	751	2	3
27-Jul	11,394	7	2,588	3	763	3	3,494	2	6254	4	896	2	3
28-Jul	13,787	9	3,530	4	941	3	4,683	2	9150	6	1,833	4	5
29-Jul	17,650	12	4,159	4	1,287	5	8,142	4	13169	8	2,591	6	6
30-Jul	22,116	15	5,222	5	2,014	7	11,486	6	16,556	10	3,320	8	9
31-Jul	24,363	16	6,679	7	3,258	12	17,442	9	19,346	12	3,617	8	11
1-Aug	25,217	17	7,576	8	4,752	17	23,632	12	24,346	15	4,348	10	13
2-Aug	30,196	20	9,252	9	5,616	20	34,693	17	27,776	18	5,770	14	16
3-Aug	42,604	28	14,658	15	6,994	25	46,631	23	34,573	22	7,192	17	22
4-Aug	54,018	35	17,970	18	8,111	29	62,144	31	39,103	25	8,614	20	26
5-Aug	64,523	42	22,236	23	9,037	32	72,327	36	46,383	29	10,036	23	31
6-Aug	75,544	50	25,812	26	9,818	35	83,068	41	55,848	35	11,458	27	36
7-Aug	83,174	54	29,557	30	10,746	39	104,004	51	65,128	41	12,880	30	41
8-Aug	88,566	58	33,503	34	11,439	41	113,334	56	73,423	46	14,302	33	45
9-Aug	97,014	63	37,651	38	12,210	44	129,929	64	82,283	52	15,724	37	50
10-Aug	106,269	70	40,484	41	12,871	46	143,643	71	89,529	56	17,146	40	54
11-Aug	110,618	72	48,508	49	15,006	54	151,624	75	91,733	58	18,568	43	59
12-Aug	116,456	76	53,571	54	16,214	58	157,449	77	95,984	60	19,990	47	62
13-Aug	120,075	79	56,314	57	16,945	61	162,002	80	98,984	62	21,412	50	65
14-Aug	122,958	80	57,889	59	17,339	62	165,859	82	102,280	64	22,834	53	67
15-Aug	125,903	82	60,897	62	17,553	63	168,933	83	105,612	66	24,256	57	69
16-Aug	127,214	83	61,924	63	17,804	64	173,405	85	111,225	70	25,908	60	71
17-Aug	128,122	84	62,705	63	18,065	65	182,537	90	114,120	72	26,459	62	73
18-Aug	128,932	84	65,193	66	18,294	66	184,808	91	126,176	79	27,610	64	75

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	1985		1986		1987		1988		1989		1990		1985-90
Date	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Avg. %
19-Aug	129,751	85	65,730	66	18,640	67	185,785	91	132,550	83	28,712	67	77
20-Aug	129,990	85	65,910	67	19,121	69	188,096	92	134,700	85	29,194	68	78
21-Aug	130,524	85	66,135	67	19,530	70	190,966	94	136,100	86	29,388	69	78
22-Aug	132,593	87	66,712	67	19,935	72	191,457	94	137,235	86	29,906	70	79
23-Aug	133,019	87	67,777	69	20,295	73	192,233	94	138,139	87	30,096	70	80
24-Aug	133,285	87	68,342	69	21,151	76	192.946	95	139,593	88	30,422	71	81
25-Aug	133,670	87	70,415	71	21,648	78	194,118	95	143,958	91	31,423	73	83
26-Aug	134,216	88	76,519	77	22,250	80	199,510	98	147,047	92	31,961	75	85
27-Aug	134,874	88	80,710	82	22,449	81	200,099	98	147,872	93	33,059	77	86
28-Aug	135,652	89	81,768	83	22,663	81	200,599	99	148,434	93	33,901	79	87
29-Aug	136,776	89	82,298	83	23,096	83	201,299	99	148,999	94	34,692	81	88
30-Aug	139,361	91	83,655	85	23,498	84	201,899	99	149,968	94	34,833	81	89
31-Aug	140,876	92	85,220	86	23,728	85	202,466	100	151,271	95	35,209	82	91
1-Sep	141,821	93	86,094	87	24,167	87	202,930	100	153,395	96	35,576	83	92
2-Sep	142,709	93	87,062	88	24,721	89	202,930	100	155,278	98	36,097	84	94
3-Sep	144,729	95	87,832	89	25,052	90	202,930	100	155,573	98	38,750	90	94
4-Sep	145,825	95	88,259	89	25,385	91	202,930	100	155,673	98	39,388	92	95
5-Sep	146,706	96	89,557	91	25,658	92	202,930	100	155,963	98	39,765	93	96
6-Sep	147,406	96	91,417	92	26,591	96	203,009	100	156,315	98	39,991	93	97
7-Sep	148,436	97	94,880	96	27,283	98	203,578	100	157,015	99	40,138	94	98
8-Sep	149,411	97	95,101	96	27,313	98	203,578	100	157,413	99	40,970	96	98
9-Sep	149,753	98	95,251	96	27,619	99	203,578	100	158,220	99	41,411	97	98
10-Sep	150,300	98	95,460	97	27,729	99	203,578	100	158,335	100	41,446	97	99
Season Total	153,026		98,958		27,892		203,578		159,123		42,889		114,244
Ending Date	21-Sep		1-Oct		19-Sep		6-Sep		28-Sep		25-Sep		

Note: The Buskin River weir was not operated during the peak pink salmon immigration after 1990.

Appendix G3.-Immigration of coho salmon through the Buskin River weir, 1987-1996.

	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
1-Aug	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
2-Aug	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
3-Aug	1	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
4-Aug	1	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
5-Aug	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
6-Aug	2	0	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
7-Aug	5	0	4	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
8-Aug	5	0	6	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
9-Aug	5	0	7	0	7	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
10-Aug	10	0	8	0	10	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
11-Aug	14	0	9	0	10	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
12-Aug	24	0	11	0	14	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
13-Aug	33	0	17	0	16	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
14-Aug	36	0	20	0	20	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0
15-Aug	42	0	20	0	25	0	1	0	37 [a]	0	29 [b]	0	21 [c]	0	0	0	23	0	44	1	0
16-Aug	50	0	26	0	35	0	2	0	74	1	58	1	42	1	0	0	27	0	130	2	1
17-Aug	51	0	60	1	44	0	18	0	111	1	87	1	63	1	4	0	56	1	234	3	1
18-Aug	66	1	72	1	71	1	42	1	148	2	116	2	86	1	4	0	95	1	273	3	1
19-Aug	68	1	92	1	105	1	56	1	185	2	145	2	87	1	12	0	113	1	370	4	2
20-Aug	81	1	112	2	133	1	101	2	222	2	174	3	220	3	31	0	135	2	425	5	2
21-Aug	104	1	197	3	148	1	161	3	259	3	203	3	224	3	48	1	172	2	646	8	3
22-Aug	117	1	222	4	159	2	195	3	295	3	232	3	310	4	68	1	208	2	811	10	3
23-Aug	139	1	232	4	171	2	231	4	450	5	261	4	388	6	77	1	236	3	987	12	4
24-Aug	195	2	245	4	185	2	259	4	468	5	288	4	419	6	130	2	269	3	1,035	12	4
25-Aug	276	2	298	5	310	3	280	5	493	5	313	5	486	7	144	2	308	4	1,175	14	5
26-Aug	315	3	650	11	370	4	340	5	531	6	420	6	553	8	153	2	341	4	1,264	15	6
27-Aug	349	3	1,110	18	381	4	356	6	556	6	507	7	620	9	176	2	370	4	1,450	17	8
28-Aug	367	3	1,610	26	393	4	380	6	605	7	549	8	721	10	185	2	503	6	1,696	20	9

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
29-Aug	388	3	2,260	37	429	4	402	6	668	7	587	9	822	12	191	2	561	6	1,928	23	11
30-Aug	407	4	3,260	53	478	5	428	7	732	8	747	11	923	13	193	2	656	8	2,193	26	14
31-Aug	418	4	3,651	59	519	5	436	7	770	8	906	13	1,024	15	198	2	1,008	12	2,555	30	16
1-Sep	430	4	3,790	61	852	9	444	7	787	9	1,087	16	1,116	16	203	2	1,128	13	2,767	33	17
2-Sep	481	4	4,116	67	991	10	456	7	947	10	1,158	17	1,209	18	214	3	1,217	14	2,943	35	18
3-Sep	510	5	4,231	68	1,041	10	463	7	1,102	12	1,185	17	1,328	19	229	3	1,270	15	3,045	36	19
4-Sep	523	5	4,298	70	1,062	11	556	9	1,615	18	1,208	18	1,443	21	235	3	1,819	21	3,117	37	21
5-Sep	539	5	4,364	71	1,167	12	853	14	1,857	20	1,230	18	1,558	23	295	4	1,919	22	3,287	39	23
6-Sep	987	9	4,431	72	1,231	12	943	15	1,954	21	1,264	19	1,673	24	397	5	2,019	23	4,925	58	26
7-Sep	1,947	18	4,553	74	1,298	13	1,000	16	2,156	23	1,329	19	1,788	26	421	5	2,219	26	5,525	65	29
8-Sep	2,561	23	4,573	74	1,365	14	1,042	17	2,756	30	1,475	22	1,908	28	470	6	2,619	30	5,875	70	31
9-Sep	4,367	39	4,624	75	2,240	23	1,138	18	2,806	30	1,665	24	2,014	29	530	7	3,019	35	6,225	74	35
10-Sep	5,071	46	4,757	77	2,295	23	1,242	20	3,115	34	1,694	25	2,151	31	640	8	3,421	39	6,519	77	38
11-Sep	5,669	51	4,986	81	2,783	28	1,249	20	3,464	38	1,730	25	2,247	33	1,017	12	3,895	45	6,980	83	42
12-Sep	5,789	52	5,160	83	3,133	32	1,301	21	4,071	44	1,781	26	2,545	37	1,635	20	4,270	49	7,254	86	45
13-Sep	6,047	54	5,305	86	3,684	37	1,743	28	4,984	54	1,820	27	2,863	41	1,796	22	4,822	55	7,631	90	50
14-Sep	6,231	56	5,387	87	4,034	41	1,886	30	5,442	59	1,926	28	3,148	46	1,933	24	5,198	60	7,831	93	52
15-Sep	6,521	59	5,427	88	4,814	48	2,222	36	5,900	64	2,001	29	3,265	47	3,526	43	5,665	65	7,931	94	57
16-Sep	7,558	68	5,448	88	5,144	52	2,565	41	6,358	69	2,061	30	4,038	59	4,464	55	5,847	67	7,976 [d]	95	62
17-Sep	8,062	73	5,476	89	5,965	60	3,565	57	6,816	74	3,373	49	4,592	67	4,804	59	6,037	69	8,026	95	69
18-Sep	8,398	76	5,490	89	6,645	67	4,065	65	7,142	77	3,556	52	4,641	67	5,737	70	6,227	72	8,076	96	73
19-Sep	8,904	80	5,645	91	7,645	77	4,565	73	7,426	81	3,602	53	4,773	69	6,090	75	6,417	74	8,126	96	77
20-Sep	9,297	84	5,686	92	8,177	82	4,965	80	7,694	83	3,633	53	5,028	73	6,381	78	6,607	76	8,135	96	80
21-Sep	9,416	85	5,725	93	8,617	87	5,165	83	8,162	88	3,666	54	5,243	76	6,683	82	6,797	78	8,211	97	82
22-Sep	9,616	87	5,748	93	9,074	91	5,365	86	8,229	89	3,671	54	5,327	77	6,985	86	6,987	80	8,247	98	84
23-Sep	9,866	89	5,828	94	9,153	92	5,515	89	8,449	92	3,673	54	5,377	78	7,330	90	7,177	83	8,264	98	86
24-Sep	10,341	93	6,182	100	9,359	94	5,608	90	8,669	94	3,678	54	5,499	80	7,550	93	7,367	85	8,289	98	88
25-Sep	10,498	95	6,182	100	9,516	96	5,830	94	8,836	96	3,698	54	5,782	84	7,731	95	7,557	87	8,314	99	90

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
26-Sep	10,777	97	6,182	100	9,601	97	5,959	96	9,017	98	3,713	54	6,108	89	7,912	97	7,747	89	8,339	99	92
27-Sep	10,848	98	6,182	100	9,651	97	5,959	96	9,163	99	5,481	80	6,383	93	7,966	98	7,937	91	8,364	99	95
28-Sep	10,914	98	6,182	100	9,701	98	6,222	100	9,224	100	5,801	85	6,555	95	8,070	99	8,127	93	8,389	99	97
29-Sep	10,993	99	6,182	100	9,752	98	6,222	100	9,224	100	5,937	87	6,727	98	8,088	99	8,317	96	8,414	100	98
30-Sep	11,078	100	6,182	100	9,805	99	6,222	100	9,224	100	6,108	90	6,899	100	8,146	100	8,507	98	8,439	100	99
1-Oct	11,103	100	6,182	100	9,836	99	6,222	100	9,224	100	6,223	91	6,899	100	8,146	100	8,694	100	8,439	100	99
Season Total	11,103		6,182		9,930		6,222		9,224 [a]		6,823 [b]		6,899 [c]		8,146		8,694		8,439 [d]		

[a] Actual weir not in place until 20 August. Numbers shown are estimates based on historical escapement averages. Methodology of estimate is in the 1997 Buskin River Fishery Data Series report (Motis *In prep b*).

[b] Actual weir not in place until 25 August. Numbers shown are estimates based on historical escapement averages. Methodology of estimate is in the 1997 Buskin River Fishery Data Series report (Motis *In prep b*).

[c] Actual weir not in place until 21 August. Numbers shown are estimates based on historical escapement averages. Methodology of estimate is in the 1997 Buskin River Fishery Data Series report (Motis *In prep b*).

[d] Weir was not put back in for the remainder of 1996, due to record rainfall amounts. Numbers are estimates based on historical escapement averages. Complete methodology is in the 1997 Buskin River Fishery Data Series report (Motis *In prep b*).

Appendix G4.-Immigration of chinook salmon through the Karluk River weir, 1987-1996.

	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	3	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	41	0	0	0	0
21-May	13	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	45	0	0	0	0
22-May	21	0	0	0	0	0	0	0	0	0	0	0	0	0	65	1	58	0	0	0	0
23-May	31	0	0	0	0	0	0	0	0	0	0	0	0	0	128	1	103	1	0	0	0
24-May	74	1	0	0	4	0	0	0	0	0	0	0	0	0	142	1	160	1	12	0	0
25-May	122	2	0	0	12	0	0	0	0	0	0	0	56	0	223	2	166	1	14	0	1
26-May	145	2	5	0	30	0	0	0	5	0	0	0	96	1	267	2	238	2	29	0	1
27-May	181	2	26	0	62	1	0	0	126	1	1	0	212	2	331	3	260	2	49	0	1
28-May	258	3	27	0	87	1	0	0	202	1	28	0	320	2	405	3	318	3	179	2	2
29-May	287	4	41	0	130	1	42	0	301	2	63	1	438	3	489	4	328	3	274	3	2
30-May	347	4	89	1	165	2	278	2	386	3	89	1	714	5	540	4	366	3	399	4	3
31-May	394	5	105	1	210	2	537	4	478	3	183	2	971	7	635	5	405	3	502	5	4
1-Jun	419	5	157	1	305	3	646	4	570	4	270	3	1517	11	743	6	529	4	679	7	5
2-Jun	515	6	276	2	451	4	1090	8	700	5	405	4	1943	14	855	7	754	6	779	8	6
3-Jun	638	8	319	2	524	5	1311	9	1310	9	529	6	2233	16	1204	10	907	7	1006	10	8
4-Jun	730	9	409	3	580	6	1586	11	1545	11	601	6	2559	18	1459	12	1094	9	1180	12	10
5-Jun	813	10	521	4	824	8	1,943	13	1,879	13	818	9	3,206	23	1,835	15	1,290	10	1,457	14	12
6-Jun	1,075	14	641	5	978	9	2,429	17	2,199	16	985	10	3,405	24	2,000	17	1,491	12	1,713	17	14
7-Jun	1,186	15	761	6	1,241	12	2,969	21	2,675	19	1,148	12	3,852	28	2,206	18	1,587	13	1,994	20	16
8-Jun	1,259	16	818	6	1,419	14	3,433	24	3,119	22	1,365	14	4,453	32	2,614	22	1,966	16	2,174	22	19
9-Jun	1,432	18	1,107	8	1,705	16	4,456	31	3,744	27	1,699	18	4,917	35	2,869	24	2,305	18	2,402	24	22
10-Jun	1,476	19	1,655	12	1,976	19	5,432	38	3,967	28	1,947	20	5,399	39	3,114	26	2,785	22	2,612	26	25
11-Jun	1,660	21	2,139	16	2,299	22	5,810	40	4,318	31	2,329	24	5,833	42	3,467	29	3,091	24	2,755	27	28
12-Jun	1,841	23	2,369	18	2,555	24	6,631	46	5,160	37	2,857	30	6,187	44	4,198	35	3,534	28	2,985	30	31
13-Jun	1,963	25	3,106	23	2,954	28	6,825	47	5,627	40	3,259	34	6,705	48	4,709	39	4,058	32	3,242	32	35
14-Jun	2,402	30	3,608	27	3,277	31	7,321	51	5,935	42	3,705	39	7,161	51	5,245	44	4,339	34	4,189	42	39
15-Jun	2,581	33	4,141	31	3,591	34	7,598	53	6,350	45	4,093	43	7,411	53	5,774	48	4,885	39	4,419	44	42
16-Jun	2,749	35	5,158	39	4,058	39	7,919	55	6,893	49	4,527	47	7,542	54	6,304	52	5,174	41	4,854	48	46

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jun	2,832	36	5,663	42	4,471	43	8,070	56	7,187	51	4,893	51	7,995	57	6,645	55	5,662	45	5,036	50	49
18-Jun	3,110	39	6,277	47	5,071	48	8,361	58	7,916	56	5,233	55	8,290	59	6,971	58	6,049	48	5,191	52	52
19-Jun	3,674	46	6,869	52	5,477	52	8,949	62	8,449	60	5,609	58	8,935	64	7,143	59	6,495	51	5,465	54	56
20-Jun	3,882	49	7,434	56	5,649	54	9,576	66	8,769	63	5,988	62	9,250	66	7,464	62	6,970	55	5,580	56	59
21-Jun	4,285	54	7,743	58	6,145	59	10,183	71	9,313	66	5,274	55	9,568	69	7,816	65	7,589	60	6,024	60	62
22-Jun	4,511	57	8,210	62	6,749	64	10,820	75	9,753	70	6,542	68	9,965	71	8,194	68	7,859	62	6,565	65	66
23-Jun	4,724	60	8,854	66	7,022	67	11,383	79	10,145	72	6,803	71	10,526	75	8,373	69	8,303	66	7,048	70	70
24-Jun	4,838	61	9,317	70	7,486	71	11,845	82	10,596	76	6,991	73	10,721	77	8,645	72	8,776	69	7,374	73	72
25-Jun	5,155	65	10,220	77	7,799	74	12,210	85	11,001	78	7,184	75	11,008	79	9,014	75	9,105	72	7,651	76	76
26-Jun	5,592	71	10,593	79	8,049	77	12,570	87	11,380	81	7,487	78	11,325	81	9,205	76	9,432	75	7,766	77	78
27-Jun	5,950	75	11,157	84	8,303	79	12,876	89	11,638	83	7,779	81	11,505	83	9,648	80	9,710	77	8,031	80	81
28-Jun	6,057	76	11,511	86	8,477	81	13,075	91	11,892	85	7,968	83	11,668	84	9,835	82	9,875	78	8,160	81	83
29-Jun	6,200	78	11,718	88	8,708	83	13,246	92	12,139	87	8,159	85	11,793	85	10,107	84	10,092	80	8,397	84	84
30-Jun	6,396	81	11,908	89	9,061	86	13,399	93	12,370	88	8,332	87	11,978	86	10,344	86	10,251	81	8,671	86	86
1-Jul	6,549	83	12,063	90	9,260	88	13,579	94	12,560	90	8,475	88	12,184	87	10,427	87	10,672	84	8,696	87	88
2-Jul	6,759	85	12,219	92	9,293	89	13,651	95	12,743	91	8,583	89	12,569	90	10,533	87	10,920	86	8,713	87	89
3-Jul	6,876	87	12,284	92	9,420	90	13,743	95	12,860	92	8,658	90	12,708	91	10,631	88	11,082	88	8,735	87	90
4-Jul	7,006	88	12,321	92	9,511	91	13,808	96	12,962	92	8,744	91	12,845	92	10,767	89	11,265	89	8,791	87	91
5-Jul	7,088	89	12,466	93	9,616	92	13,867	96	13,127	94	8,810	92	12,925	93	10,829	90	11,350	90	8,809	88	92
6-Jul	7,172	90	12,590	94	9,764	93	13,934	96	13,267	95	8,853	92	13,039	94	10,876	90	11,419	90	8,817	88	92
7-Jul	7,258	92	12,668	95	9,818	94	13,966	97	13,323	95	8,929	93	13,146	94	10,923	91	11,509	91	8,818	88	93
8-Jul	7,345	93	12,686	95	9,838	94	14,025	97	13,390	95	8,977	94	13,191	95	11,046	92	11,643	92	8,828	88	93
9-Jul	7,434	94	12,762	96	9,872	94	14,033	97	13,434	96	8,996	94	13,248	95	11,078	92	11,686	92	8,836	88	94
10-Jul	7,499	95	12,841	96	9,904	94	14,044	97	13,484	96	9,023	94	13,302	95	11,138	92	11,839	94	8,842	88	94
11-Jul	7,547	95	12,873	97	9,955	95	14,069	97	13,546	97	9,094	95	13,359	96	11,189	93	11,915	94	8,844	88	95
12-Jul	7,570	95	12,875	97	10,023	96	14,074	97	13,619	97	9,129	95	13,385	96	11,230	93	11,955	94	8,859	88	95
13-Jul	7,609	96	12,933	97	10,045	96	14,081	98	13,646	97	9,141	95	13,408	96	11,276	94	12,006	95	8,860	88	95
14-Jul	7,632	96	12,969	97	10,081	96	14,107	98	13,692	98	9,181	96	13,470	97	11,301	94	12,072	95	8,862	88	95
15-Jul	7,650	96	13,004	98	10,113	96	14,112	98	13,714	98	9,201	96	13,495	97	11,327	94	12,111	96	8,864	88	96
16-Jul	7,691	97	13,040	98	10,145	97	14,130	98	13,733	98	9,215	96	13,532	97	11,347	94	12,144	96	8,880	88	96

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jul	7,706	97	13,061	98	10,168	97	14,145	98	13,746	98	9,241	96	13,547	97	11,355	94	12,183	96	8,904	89	96
18-Jul	7,723	97	13,078	98	10,185	97	14,158	98	13,765	98	9,275	97	13,589	97	11,357	94	12,204	96	8,930	89	96
19-Jul	7,739	98	13,104	98	10,207	97	14,175	98	13,775	98	9,294	97	13,607	98	11,365	94	12,211	96	8,944	89	96
20-Jul	7,755	98	13,123	98	10,215	97	14,203	98	13,785	98	9,309	97	13,623	98	11,367	94	12,239	97	9,357	93	97
21-Jul	7,773	98	13,135	98	10,236	98	14,212	98	13,800	98	9,318	97	13,648	98	11,420	95	12,266	97	9,383	93	97
22-Jul	7,787	98	13,154	99	10,242	98	14,222	98	13,810	98	9,335	97	13,694	98	11,472	95	12,285	97	9,515	95	97
23-Jul	7,799	98	13,160	99	10,261	98	14,240	99	13,820	99	9,341	97	13,728	98	11,538	96	12,298	97	9,602	96	98
24-Jul	7,810	98	13,167	99	10,278	98	14,253	99	13,825	99	9,350	97	13,736	99	11,623	96	12,314	97	9,608	96	98
25-Jul	7,819	99	13,175	99	10,280	98	14,263	99	13,837	99	9,360	97	13,759	99	11,687	97	12,345	98	9,638	96	98
26-Jul	7,826	99	13,185	99	10,280	98	14,281	99	13,849	99	9,371	98	13,765	99	11,697	97	12,375	98	9,650	96	98
27-Jul	7,837	99	13,193	99	10,288	98	14,291	99	13,870	99	9,394	98	13,768	99	11,728	97	12,393	98	9,656	96	98
28-Jul	7,844	99	13,197	99	10,292	98	14,297	99	13,879	99	9,404	98	13,776	99	11,770	98	12,418	98	9,755	97	98
29-Jul	7,848	99	13,219	99	10,298	98	14,305	99	13,889	99	9,433	98	13,788	99	11,777	98	12,472	99	9,796	97	99
30-Jul	7,862	99	13,223	99	10,309	98	14,309	99	13,899	99	9,450	98	13,789	99	11,797	98	12,481	99	9,801	98	99
31-Jul	7,865	99	13,228	99	10,315	98	14,312	99	13,919	99	9,480	99	13,803	99	11,814	98	12,485	99	9,850	98	99
1-Aug	7,871	99	13,241	99	10,329	99	14,316	99	13,920	99	9,499	99	13,827	99	11,823	98	12,489	99	9,886	98	99
Season Total	7,930		13,337		10,484		14,442		14,022		9,601		13,944		12,049		12,657		10,051		

Appendix G5.-Immigration of chinook salmon through the Ayakulik River weir, 1987-1996.

	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
20-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0
21-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0
22-May	0	0	0	0	0	0	0	0	0	0	205	2	0	0	39	0	0	0	0	0	0
23-May	0	0	0	0	0	0	0	0	0	0	361	4	21	0	63	1	0	0	0	0	0
24-May	30	0	0	0	0	0	0	0	0	0	800	9	28	0	88	1	0	0	25	0	1
25-May	36	0	15	0	0	0	0	0	20	0	885	10	37	0	100	1	0	0	65	1	1
26-May	85	1	284	1	0	0	0	0	78	1	1042	11	44	1	129	1	0	0	73	1	2
27-May	167	1	401	2	0	0	800	7	113	1	1351	15	103	1	158	2	2	0	75	1	3
28-May	225	1	560	3	0	0	1318	12	380	3	1588	17	241	3	204	2	11	0	91	1	4
29-May	270	2	714	3	0	0	1709	15	566	4	1699	19	326	4	210	2	22	0	111	1	5
30-May	361	2	892	4	0	0	2137	19	603	5	1836	20	370	5	265	3	29	0	123	1	6
31-May	415	3	1021	5	7	0	2409	21	655	5	2012	22	821	11	294	3	41	0	318	3	7
1-Jun	491	3	1106	5	58	0	3100	28	671	5	2045	22	1927	25	328	4	127	1	622	6	10
2-Jun	526	3	1176	6	202	1	3797	34	697	5	2385	26	3118	40	568	6	349	2	961	9	13
3-Jun	538	3	1400	7	255	2	4144	37	711	5	2879	32	3225	41	694	8	532	3	1642	16	15
4-Jun	913	6	1634	8	387	3	4393	39	772	6	2957	32	3352	43	1304	14	2818	16	1822	18	18
5-Jun	1,285	8	1,872	9	494	3	4,988	44	961	7	3,030	33	3,585	46	1,565	17	3,602	20	2,020	20	21
6-Jun	2,071	13	2,086	10	804	5	5,708	51	1,544	12	3,384	37	3,623	46	1,636	18	4,111	23	2,988	29	24
7-Jun	2,442	16	2,278	11	1,272	8	5,787	51	3,068	24	4,073	45	3,686	47	1,860	20	4,397	25	3,317	32	28
8-Jun	2,611	17	2,426	11	1,408	9	6,659	59	4,164	32	4,273	47	3,708	47	2,731	30	5,167	29	3,404	33	31
9-Jun	2,743	18	2,590	12	1,520	10	6,893	61	5,852	45	4,414	48	3,861	49	3,257	36	5,466	31	3,413	33	34
10-Jun	3,157	20	2,857	13	2,134	14	7,005	62	7,116	55	4,480	49	4,154	53	3,641	40	5,671	32	3,473	34	37
11-Jun	3,580	23	3,975	19	2,967	19	7,157	64	7,714	59	4,624	51	4,537	58	3,797	42	5,936	34	3,511	34	40
12-Jun	3,671	23	5,045	24	4,073	26	7,216	64	8,268	64	4,848	53	4,807	61	4,293	47	6,245	35	3,585	35	43
13-Jun	3,804	24	7,117	33	4,966	32	7,427	66	8,311	64	5,115	56	5,041	64	4,321	47	7,213	41	3,740	36	46
14-Jun	4,044	26	7,586	35	5,580	36	7,433	66	8,728	67	5,261	58	5,160	66	4,544	50	7,470	42	4,080	39	49
15-Jun	4,158	27	7,897	37	6,732	44	7,448	66	8,858	68	5,435	59	5,255	67	4,825	53	7,800	44	4,773	46	51
16-Jun	4,432	28	8,979	42	7,357	48	7,698	68	8,884	68	5,626	62	5,437	70	4,933	54	8,160	46	5,579	54	54

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
17-Jun	5,006	32	10,020	47	8,238	53	7,948	71	9,001	69	5,807	64	5,553	71	5,155	56	8,633	49	6,015	58	57
18-Jun	5,411	35	10,268	48	9,192	60	8,198	73	9,168	71	5,901	65	5,664	72	5,347	59	9,021	51	6,113	59	59
19-Jun	5,714	37	12,263	57	9,218	60	8,448	75	9,259	71	6,085	67	5,834	75	5,461	60	9,368	53	6,161	60	61
20-Jun	5,971	38	12,340	58	10,032	65	8,578	76	9,295	72	6,116	67	5,917	76	5,536	61	9,781	55	6,428	62	63
21-Jun	7,037	45	13,453	63	10,259	66	8,983	80	9,317	72	6,520	71	5,936	76	5,771	63	11,126	63	7,144	69	67
22-Jun	7,689	49	14,292	67	10,440	68	9,242	82	9,482	73	6,672	73	6,041	77	5,931	65	11,797	67	7,583	73	69
23-Jun	8,669	55	14,676	69	10,587	69	9,605	85	9,698	75	7,189	79	6,075	78	6,190	68	12,269	69	8,746	85	73
24-Jun	9,419	60	15,276	71	10,865	70	9,890	88	10,274	79	7,430	81	6,118	78	6,789	74	13,292	75	8,819	85	76
25-Jun	9,644	62	15,967	75	11,077	72	10,095	90	10,614	82	7,527	82	6,490	83	7,229	79	14,207	80	8,915	86	79
26-Jun	10,019	64	16,323	76	11,836	77	10,137	90	10,754	83	7,667	84	6,732	86	7,724	85	14,618	83	9,010	87	81
27-Jun	11,071	71	17,161	80	12,084	78	10,180	90	10,815	83	7,800	85	6,778	87	7,906	87	15,177	86	9,083	88	84
28-Jun	11,441	73	17,640	83	12,347	80	10,202	91	11,419	88	7,933	87	6,872	88	7,990	87	15,557	88	9,269	90	85
29-Jun	11,674	75	18,038	84	13,192	85	10,400	92	11,916	92	8,067	88	6,908	88	8,093	89	15,702	89	9,434	91	87
30-Jun	12,071	77	18,522	87	13,312	86	10,561	94	12,039	93	8,153	89	6,947	89	8,261	90	16,291	92	9,557	92	89
1-Jul	12,409	79	18,886	88	13,396	87	10,656	95	12,122	93	8,221	90	6,960	89	8,443	92	16,446	93	9,582	93	90
2-Jul	12,769	82	19,212	90	13,430	87	10,739	95	12,338	95	8,285	91	7,186	92	8,522	93	16,676	94	9,642	93	91
3-Jul	13,695	88	19,277	90	13,651	88	10,809	96	12,370	95	8,395	92	7,234	93	8,619	94	16,771	95	9,750	94	93
4-Jul	14,375	92	19,370	91	13,815	90	10,821	96	12,465	96	8,474	93	7,266	93	8,661	95	16,810	95	9,809	95	93
5-Jul	14,592	93	19,398	91	14,148	92	10,834	96	12,514	96	8,503	93	7,288	93	8,691	95	16,850	95	9,858	95	94
6-Jul	14,732	94	19,664	92	14,251	92	10,877	97	12,549	97	8,581	94	7,368	94	8,740	96	16,914	96	9,988	97	95
7-Jul	14,770	94	19,883	93	14,543	94	10,894	97	12,572	97	8,660	95	7,408	95	8,806	96	17,155	97	10,087	98	96
8-Jul	14,931	95	20,211	95	14,667	95	10,948	97	12,589	97	8,750	96	7,438	95	8,832	97	17,182	97	10,132	98	96
9-Jul	14,692	94	20,410	96	14,668	95	10,953	97	12,610	97	8,755	96	7,471	96	8,873	97	17,220	97	10,153	98	96
10-Jul	15,071	96	20,416	96	14,669	95	10,970	98	12,636	97	8,768	96	7,530	96	8,942	98	17,315	98	10,153	98	97
11-Jul	15,176	97	20,449	96	14,721	95	10,970	98	12,638	97	8,840	97	7,547	97	8,973	98	17,359	98	10,172	98	97
12-Jul	15,270	98	20,493	96	14,862	96	10,971	98	12,640	97	8,891	97	7,573	97	8,990	98	17,376	98	10,194	99	97
13-Jul	15,289	98	20,562	96	14,943	97	10,973	98	12,691	98	8,916	98	7,587	97	9,008	99	17,414	98	10,194	99	98
14-Jul	15,350	98	20,836	98	14,962	97	10,999	98	12,709	98	8,958	98	7,615	97	9,025	99	17,420	98	10,202	99	98

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	1987		1988		1989		1990		1991		1992		1993		1994		1995		1996		1987-96
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Avg %
15-Jul	15,362	98	20,881	98	14,991	97	11,025	98	12,711	98	8,967	98	7,649	98	9,036	99	17,459	99	10,211	99	98
16-Jul	15,376	98	20,948	98	14,998	97	11,042	98	12,715	98	8,984	98	7,659	98	9,054	99	17,490	99	10,227	99	98
17-Jul	15,406	99	20,949	98	15,013	97	11,042	98	12,721	98	9,003	99	7,682	98	9,069	99	17,512	99	10,234	99	98
18-Jul	15,423	99	20,963	98	15,019	97	11,042	98	12,728	98	9,018	99	7,704	99	9,082	99	17,516	99	10,249	99	98
19-Jul	15,440	99	20,965	98	15,077	98	11,042	98	12,728	98	9,020	99	7,704	99	9,088	99	17,549	99	10,256	99	99
20-Jul	15,456	99	21,033	98	15,092	98	11,051	98	12,733	98	9,030	99	7,706	99	9,094	99	17,577	99	10,260	99	99
21-Jul	15,471	99	21,058	99	15,127	98	11,076	98	12,749	98	9,054	99	7,708	99	9,099	99	17,581	99	10,266	99	99
22-Jul	15,475	99	21,065	99	15,160	98	11,087	99	12,795	99	9,060	99	7,713	99	9,104	99	17,585	99	10,289	99	99
23-Jul	15,485	99	21,085	99	15,192	98	11,093	99	12,809	99	9,060	99	7,716	99	9,105	99	17,599	99	10,291	99	99
24-Jul	15,489	99	21,093	99	15,209	99	11,105	99	12,835	99	9,069	99	7,749	99	9,108	99	17,610	99	10,293	99	99
25-Jul	15,514	99	21,113	99	15,210	99	11,107	99	12,835	99	9,076	99	7,749	99	9,111	99	17,618	99	10,298	99	99
26-Jul	15,532	99	21,123	99	15,241	99	11,115	99	12,836	99	9,080	99	7,757	99	9,111	99	17,620	99	10,301	99	99
27-Jul	15,541	99	21,135	99	15,257	99	11,118	99	12,881	99	9,081	99	7,758	99	9,113	99	17,628	99	10,305	99	99
28-Jul	15,547	99	21,173	99	15,258	99	11,133	99	12,886	99	9,086	99	7,771	99	9,115	99	17,637	99	10,307	99	99
29-Jul	15,553	99	21,184	99	15,268	99	11,158	99	12,892	99	9,088	99	7,778	99	9,116	99	17,649	99	10,308	99	99
30-Jul	15,555	99	21,204	99	15,310	99	11,169	99	12,897	99	9,091	99	7,781	99	9,118	99	17,651	99	10,314	99	99
31-Jul	15,567	99	21,206	99	15,318	99	11,180	99	12,901	99	9,094	99	7,781	99	9,118	99	17,659	99	10,316	99	99
1-Aug	15,573	99	21,210	99	15,323	99	11,192	99	12,901	99	9,098	99	7,788	99	9,120	99	17,664	99	10,321	99	99
Season Total	15,636		21,370		15,432		11,251		12,988		9,135		7,819		9,138		17,701		10,344		

Appendix G6.-Chignik River chinook salmon escapement, time of entry, 1987-1996.

Date	1987 % Total	1988 % Total	1989 % Total	1990 % Total	1991 % Total	1992 % Total	1993 % Total	1994 % Total[a]	1995 % Total	1996 % Total	1987-96 % Avg.
20-Jun	1	0	1	1	1	1	1	1	1		1
21-Jun	1	0	1	1	2	1	1	1	1		1
22-Jun	1	1	1	1	2	1	1	1	1		1
23-Jun	1	1	1	1	2	1	2	1	1		1
24-Jun	2	1	1	1	2	2	4	2	1		2
25-Jun	2	1	1	3	3	4	5	2	1		3
26-Jun	2	2	1	5	3	4	7	2	1		3
27-Jun	5	3	2	5	4	5	9	2	2		5
28-Jun	6	3	2	6	6	9	11	4	3	1	6
29-Jun	7	5	10	7	6	11	14	6	3	1	8
30-Jun	8	6	10	10	7	15	16	9	3	1	10
1-Jul	9	6	12	12	9	18	17	10	3	1	11
2-Jul	13	7	13	14	11	21	19	11	3	2	13
3-Jul	14	13	23	16	13	23	23	14	3	2	17
4-Jul	15	19	28	19	15	28	29	19	4	2	20
5-Jul	16	26	29	23	19	34	33	25	5	2	24
6-Jul	17	27	30	26	22	37	38	30	16	3	27
7-Jul	19	30	35	30	23	41	42	32	18	3	30
8-Jul	24	33	38	36	36	48	43	38	23	3	35
9-Jul	29	41	40	46	42	53	44	43	29	3	40
10-Jul	39	57	45	48	45	58	49	49	34	4	47
11-Jul	42	66	46	50	50	64	56	53	36	4	51
12-Jul	45	71	48	53	52	69	61	58	44	5	55
13-Jul	52	72	58	55	56	72	68	61	53	5	60
14-Jul	54	74	61	61	60	75	74	63	58	5	63
15-Jul	63	77	67	66	63	81	77	66	63	5	68
16-Jul	68	78	68	68	68	82	82	73	63	6	71
17-Jul	70	81	69	71	69	84	85	78	65	6	74
18-Jul	73	84	70	75	69	86	88	82	69	7	77

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Date	1987 % Total	1988 % Total	1989 % Total	1990 % Total	1991 % Total	1992 % Total	1993 % Total	1994 % Total[a]	1995 % Total	1996 % Total	1987-96 % Avg.
19-Jul	74	86	72	78	72	88	93	84	74	74	79
20-Jul	79	88	74	81	79	90	95	88	76	77	83
21-Jul	84	90	75	86	80	91	95	89	78	78	85
22-Jul	87	92	83	90	87	92	95	91	81	80	88
23-Jul	90	92	87	91	90	93	96	93	83	82	90
24-Jul	92	93	89	92	93	94	97	95	84	84	91
25-Jul	96	94	90	93	95	95	97	96	87	86	93
26-Jul	97	96	92	95	96	96	98	97	89	87	94
27-Jul	97	96	93	97	97	97	98	98	91	89	95
28-Jul	98	98	95	98	98	97	99	99	91	90	96
29-Jul	99	99	99	99	99	99	99	99	92	91	97
30-Jul	99	99	99	99	99	99	99	99	92	92	98
31-Jul	100	100	100	100	100	100	100	100	100	100	100
Season Total	2,624	4,868	3,316	4,364	4,545	3,806	1,946	3,016			

Note: Percentages are based on weir passage estimates and a 3-day lag time applied to catches made in Chignik Lagoon (statistical area 271-10) to approximate arrival at the weir. In addition, percentages do not include 1- and 2-ocean chinook salmon which cannot be distinguished from sockeye salmon at the weir counting gate.

[a] Starting in 1994 underwater video cameras were used to count fish. One and 2-ocean chinook salmon were counted. In the past these small chinook salmon were not distinguishable from sockeye and abundance estimates of small chinook were made based on scale samples. Also beginning in 1994 each fish was actually counted. In previous years 10-minute counts were made each hour and these counts were expanded to generate an estimated count.

APPENDIX H. EMERGENCY ORDERS ISSUED FOR THE KMA, 1989-1996

Appendix H1.-1989 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-17-89	9/11/89 12:01 a.m.	Extended the closure for freshwater streams flowing into Monashka and Chiniak Bays to sport fishing for salmon beginning 12:01 a.m. September 11, 1989 through 12:01 a.m. October 1, 1989 including the Buskin River upstream of Bridge #1. Low escapement of coho salmon and late spawning of pink salmon was the stated justification.
2-SS-4-18-89	9/18/89	Rescinded E.O. # 2-SS-4-17-89. Surveys and weir counts indicated sufficient escapement had been achieved and more fish were returning daily.

Appendix H2.-1990 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-27-90	9/6/90 Noon	Closed Morris Cove Creek, Humpy Cove Creek, Summers Bay Creek, Captains Bay Creek, Unalaska Creek from the outlet of Unalaska Lake to the downstream end of the Church Hole to sport fishing. Extremely low water hindered coho escapement plus illegal snagging was increasingly common.
2-SS-4-31-90	9/21/90 6:00 a.m.	Above waters were reopened, with the exception of Unalaska Creek from the Iliulik Bridge to the Church Hole. Normal water flows were allowing escapement to occur.
2-SS-4-28-90	9/11/90 12:01 a.m.	Extended the closure of salmon sport fishing upstream of the highway in streams flowing into Monashka and Chiniak bays. The Buskin River remained closed above Bridge #1. Coho escapement in the Buskin, Roslyn, American and Olds were below average.
2-SS-4-33-90	9/26/90 6:00 a.m.	Above waters were opened to salmon sport fishing. Normal coho escapement was being achieved.

Appendix H3.-1991 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-PS-4-11-91	6/15/91 Midnight	Closed the fresh waters of Unalaska, Iliukliuk, Humpy, and Summers Cove due to low escapements and high harvests.

Appendix H4.-1992 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-PS-4-30-92	8/17/92	The majority of streams along the Kodiak Road System Zone are experiencing the third consecutive year of below average pink salmon escapements. Eight index streams were surveyed on August 13 and minimum escapement goals are expected to be reached in only two of these streams. The Buskin, American and Olds rivers are the major pink salmon producing streams in Chiniak Bay and only about one half of the minimum escapement goal is expected to be reached in these streams. In order to conserve the pink salmon resources along the Kodiak Road System Zone and still allow for a limited harvest where stocks are not severely depressed, the bag and possession limit for pink salmon is being reduced to 2 fish and the Buskin, American and Olds rivers are being closed to pink salmon fishing.
2-SS-4-32-92	9/11/92	Coho salmon escapement counts through the Buskin River weir are low for this time of year, and the count of 1,187 as of September 8 may indicate a below average return. The 1992 Buskin River parent year had the lowest coho escapement since a weir was installed in 1985, and this also indicates that the 1992 coho return may be weak. Other index streams in Chiniak Bay also have had low numbers of coho in them. In order to ensure that escapement goals are met and that the reproductive potential of the coho stocks is not damaged, salmon fishing will remain closed above the highway for streams flowing into Monashka and Chiniak bays, with the exception of the Buskin River which will remain closed above Bridge No. 1. This enclosure does not affect saltwater fishing or streams that do not flow into Chiniak or Monashka Bay.

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Emergency Order Number	Effective Date	Action/Justification
2-SS-4-32-92	9/11/92	Coho salmon exhibit wide ranging dates of when they return which vary from year to year and are often influenced by weather conditions and water levels in streams. The Department will continue to monitor escapement into the Buskin River and other indexed streams and if escapement improves, waters above the Chiniak Highway will be opened to fishing.
2-SS-4-35-92	10/7/92	Coho salmon escapements into Chiniak and Monashka Bay streams have been late and below average in number. In order to ensure that sufficient spawning escapement occurred so that strong returns would continue in the future, sport fishing for salmon above the Chiniak Highway and Bridge #1 on the Buskin River was closed. The Department has continued to monitor escapements, and in early October minimum spawning goals were surpassed so that a sport fish harvest above the Chiniak Highway can now occur without damaging the reproductive potential of the coho stocks. The Buskin River is the major producer of coho in Chiniak Bay, and the weir allows accurate counts of escapement. On October 1 the weir count was 6,000 coho with daily counts averaging about 100 coho. Since minimum escapement goals have been exceeded at this time and because fish are still entering the rivers, flowing waters above the Chiniak Highway and above Bridge #1 on the Buskin River will be open to salmon fishing effective Wednesday, October 7.

Appendix H5.-1993 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-09-93	6/3/93	The Buskin River was open to sport fishing for king salmon. Returning adult king salmon from the Mill Bay stocking project were straying into the Buskin River. Opening the Buskin River to king salmon fishing would allow these fish to be harvested.

Appendix H6.-1994 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-08-94	5/28/94	In 1989 the Department of Fish and Game initiated a king salmon stocking program in Mill Bay. This program was intended to create a put-and-take fishery where all returning adult king salmon would be harvested by anglers. Yearly stocking of king salmon smolt is intended to maintain the return, so natural spawning of adult kings is not needed. Some returning adults strayed from Mill Bay and entered the Buskin River drainage. The Buskin River is currently closed to king salmon fishing by regulation and has no natural run. This Emergency Order opened sport fishing for king salmon in the Buskin River drainage so that the returning adults to the Mill Bay stocking project could be harvested.
2-SS-4-40-94	9/11/94	Coho salmon escapement counts through the Buskin River weir were low for the time of year, and the count of 400 as of September 6 indicated a below average return. Other index streams in Chiniak Bay also had low numbers of coho in them. In order to ensure that escapement goals were met and that the reproductive potential of the coho stocks was not damaged, salmon fishing remained closed above the highway for streams flowing into Monashka and Chiniak bays, with the exception of the Buskin River which remained closed above Bridge No. 1. The closure did not affect saltwater fishing or streams that do not flow into Chiniak or Monashka Bay.

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Emergency Order Number	Effective Date	Action/Justification
2-SS-4-42-94	9/17/94	Coho salmon escapements into Chiniak and Monashka Bay streams had been late and below average in number. In order to ensure that sufficient spawning escapement occurred so strong returns would continue in the future, sport fishing for salmon above the Chiniak Highway and Bridge #1 on the Buskin River was closed. The Department continued to monitor escapements. Weir counts improved on September 14, and interim spawning goals were surpassed so that a sport fish harvest above the Chiniak Highway could occur without damaging the reproductive potential of the coho stocks. The Buskin River is the major producer of coho in Chiniak Bay, and the weir allows accurate counts of escapement. On September 14 the season total weir count was 3,526 with daily counts averaging about 300 coho. Since interim escapement goals had been exceeded and because fish were still entering the rivers, it was anticipated that spawning goals would be met. Therefore, flowing waters above the Chiniak Highway and above Bridge #1 on the Buskin River were open to salmon fishing effective Saturday, September 17.

Appendix H7.-1995 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-KS-4-05-95	5/20/95	In 1989 the Department of Fish and Game initiated a king salmon stocking program in Mill Bay. This program was intended to create a put-and-take fishery where all returning adult king salmon would be harvested by anglers. Yearly stocking of king salmon smolt is intended to maintain the return, so natural spawning of adult kings is not needed. Some returning adults strayed from Mill Bay and entered the Buskin River drainage. The Buskin River is currently closed to king salmon fishing by regulation and has no natural run. This emergency order opened sport fishing for king salmon in the Buskin River drainage so that the returning adults to the Mill Bay stocking project could be harvested.

Appendix H8.-1996 KMA emergency orders.

Emergency Order Number	Effective Date	Action/Justification
2-SS-4-42-96	9/9/96	The Department operates a weir on the Buskin River in order to enumerate coho salmon. A weir count of 6,000 coho by October 1 is necessary in order to achieve escapement goals and ensure the reproductive potential of the stock is not jeopardized. Due to the sporadic run timing of the return, the opening date for salmon fishing in the upper Buskin drainage is often adjusted from the established regulation date in order to account for variations in run timing and size. As of September 4, 3,300 coho have been counted through the weir, and it is projected that the final weir count on October 1 will significantly exceed the 6,000 fish goal. Because of the early run timing and strength of the return, the entire Buskin River will open to salmon fishing on September 9, seven days before the regulation opening date.

APPENDIX I. PRIORITIZED SYNOPSES OF ACCESS PROJECTS RECOMMENDED FOR THE KMA AND ACCESS RELATED ACTIVITIES DURING 1996

Appendix I1.-Prioritized synopses of access projects recommended for the KMA in 1996.

Extension of the Anton Larsen Bay boat launch ramp: Anglers launch boats from this existing boat launch in order to gain access to popular halibut fishing waters around Whale Island. Vessels also launch here to fish for sockeye and coho salmon returning to Afognak and Crescent lakes, as well as many smaller salmon systems. Currently it is very difficult to launch at low tide. In order to remedy this situation the boat ramp was extended in 1995. However, the extension was done at a sharp angle in order to allow the ramp to reach deeper water at low tide. The sharp angle makes it difficult to back boat trailers down the ramp and turn onto the new ramp extension. Additional fingers should be added next to the old ramp and the extension so that boat trailers can negotiate the angle between the old ramp and the extension.

Parking lot improvement adjacent to the Anton Larsen Bay boat ramp: This is a cooperative project with the Kodiak Island Borough. Currently people launching their vessels at the boat launch must park their vehicles and trailers along a very narrow road. This project will create a parking lot which will help alleviate traffic congestion and also increase the safety of individuals using the facility. A more functional boat ramp is also part of the scheduled improvements.

Secure access along the Olds and American rivers: Currently the Olds and American rivers produce 17% of the freshwater fishing effort along the Kodiak road system. Fishing effort concentrates in three areas, around the two river bridges and at the mouth of the Olds River. This land is owned by a local native corporation, and anglers are currently trespassing on private land. Actions should be taken so that public access can be assured in the future.

Secure access along the Karluk River: The Karluk River provides for one of the best sport fisheries within the Kodiak Management Area. It provided 7,000 angler days in 1995. A catch of 4,000 chinook, 1,000 steelhead, 600 coho, 5,000 sockeye salmon and 3,400 Dolly Varden was reported from the Karluk River in 1995. The entire river system and lagoon are located on private property. Anglers are currently allowed to fish by purchasing use permits from the native corporation that owns this land. As these private landowners develop their land, there is no guarantee that public access will be allowed. Currently the Exxon Valdez Trustee Council is in negotiation with the landowners to purchase land for public use. The division should try to develop alternate plans to guarantee public access in case the trustee council's negotiations fail.

There are four 17 B site easements and two trail easements located along the Karluk River and Lagoon. Two of the site easements and neither trail are marked. Marking of these easements is the responsibility of the Bureau of Land Management (BLM). However, the Department should assist and encourage BLM to mark these easements because it will help reduce confusion on where these easements are located for anglers wishing to use them.

Secure access on Afognak Lagoon: The Afognak Lagoon fishery is located 25 miles NW of the town of Kodiak or 15 miles from the boat ramp facility at Anton Larsen Bay, which the department is currently improving. Access to the Afognak Lagoon fishery is mainly by motor boat from Kodiak. However, some people do fly over and are dropped off. The main fishery is

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for coho and occurs in the saltwater lagoon. In 1990 the department conducted a creel survey and documented a harvest of 3,010 coho and a release of 1,016 fish. Angler hours from August 10 to September 10 were estimated at 3,700. Besides coho, there is a sockeye run of about 80,000 fish and also a return of pink salmon and Dolly Varden.

Fishing, boat mooring and camping tend to concentrate around the washed-out bridge where the lagoon narrows to 50 feet in width. A BLM 17-B site easement is pending at this location, but acquiring public land in this area should be pursued.

Secure access along the Anton Larsen River: The Anton Larsen River has a small run of pink salmon, and during July and August families drive out to the river and set up campsites. They will spend several days camping and fishing for pink salmon. The camping area is also a starting place for the hike up to Cascade Lake which is stocked by the department with rainbow trout and grayling. This area does not generate large numbers of angler days; however, it does provide another recreational opportunity along the road system. Cascade Lake is one of the most productive stocked lakes. It is probably the most heavily used and is a very beautiful lake. The hour-long hike into the lake makes it attractive to backpackers.

Purchasing or securing access to a small parcel of land along the mouth of the Anton Larsen River should be pursued.

Land status investigation of road system stocked lakes: Twenty-three lakes within the Kodiak road system zone have been stocked with landlocked rainbows, grayling and coho over the past 10 years. Land access was never an issue in the past. However, landowners are now starting to develop and use their lands. It is now time for the department to review the lake stocking program. The land and access status of each lake should be described. If the lakes are not on public land, the private landowner should be approached and asked to grant public access to the stocked lake. If public access is not guaranteed then the lake should no longer be stocked. A compilation of land status work done to date is shown on Appendix I2.

Appendix I2.-Access related activities during 1996.

Anton Larsen Bay boat launch: In 1996, the Kodiak Island Borough (KIB) significantly improved the boat dock which is located about 100 yards from the existing boat launch ramp, replacing the floats, dock and access walkways to the dock. The Division of Sport Fish is currently working with the KIB and the Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation, Design and Construction Section, to develop a design for replacing the existing boat launch ramp with one which functions through all stages of tide and to construct offroad parking to accommodate the present level of use at the boat ramp (40-60 ton vehicles and trailers).

Ayakulik River access: Securing and clarifying angler access at the Ayakulik River mouth was identified as a priority in the 1995 Annual Management Report. The state of Alaska, BLM and the Ayakulik Native Corporation met in 1996 regarding contested 17B public easements. As a result of these meetings the original 17B easements were terminated, and two new easements were donated by the Ayakulik Native Corporation. One easement is 100 ft x 30 ft centered on the Ayakulik weir location and allows rafters to portage around the weir. The other easement is 75 feet in length and is bound by the ocean on one side and the lagoon on the other. This easement will allow anglers to access both float and wheel planes once they have ended their float trips. Resolution of easement site locations will allow for final conveyance of land to the Ayakulik Native Corporation. The river banks and uplands bordering the lower mile of river will become private property, and the public will not be allowed to trespass on this land without permission from the landowners. Final land conveyance and easement creation will be finalized prior to the 1997 fishing season.

Land status investigation of road system stocked lakes: The first step in determining what lakes were on private property and checking with the landowner to see if they will grant public access has been taken. The following list of land status surrounding stocked lakes was compiled by Regional Access personnel. The next step is to contact the landowner to determine if they will allow free public access:

LAND STATUS SURROUNDING KODIAK ISLAND STOCKED LAKES

Lake Name and Location	*Access Location and Status*
Aurel Lake (Bell's Flats): T.28S, R.21W, Sec. 35 & 36 T.29S, R.21W, Sec. 3	Accessed from a Bell's Flats and Russian Creek Subdivision road. Lake and access trail lie entirely on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539).

Lake Name and Location	*Access Location and Status*
Boy Scout Lake: T.28S, R.20W, Sec. 11	Public access is available from the 100 foot wide, Chiniak Road right-of-way where it intersects ordinary high water along the western shore line. All other portions of the lake and its shoreline lie on property owned by the Natives of Kodiak.
Bull Lake (Pasagshak Point): T.32S, R.20W, Sec. 2 T.31S, R.20W, Sec. 35	The northern 1/4 lies on property owned by Lesnoi. The remainder lies on State-owned land. Public access is available from the Chiniak Road right-of-way intersection at the south end of the lake.
Caroline Lake (Bell's Flats): T.28S, R.21W, Sec. 36	Accessed from a Bell's Flats and Russian Creek Subdivision road. Lake and access trail lie entirely on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539).
Cascade Lake (Anton Larsen Bay): T.27S, R.21W, Sec. 12	Road and trail intersection lie in Sec. 14, trail traverses secs. 14, 13 and 12 (1 1/2 mile access from road). No legal easement. Only potential access crosses land owned by the Ouzinkie Native Corp.
Cicely Lake (Bell's Flats): T.28S, R.21W, Sec. 36	Accessed from a Bell's Flats and Russian Creek Subdivision road. Lake and access trail lie entirely on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539).
Dolgoi Lake (Long Is.): T.28S, R.19W, Sec. 12 T.28S, R.18W, Sec. 7	Lake and access road lie entirely on property owned by Lesnoi. The road does not lie within a public use easement or right-of-way. Lesnoi is currently allowing public access to their land, with prior permission.
Heitman Lake (Womens Bay): T.29S, R.20W, Sec. 5	Western 3/4 lies on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539). Remainder of lake and access trail lie on BLM property (Lot 1, USS 2539).
Horseshoe Lake/Dragonfly (Middle Bay): T.29S, R.20W, Sec. 35	Lake and access trail lie entirely on BLM property. Described as Lot 21, USS 2539: (Controlled by USCG).

Lake Name and Location	*Access Location and Status*
Jack Lake (Bell's Flats): T.28S, R.21W, Sec. 25 & 26	Accessed from a Bell's Flat and Russian Creek Subdivision road. Lake and access trail lie entirely on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539).
Jupiter and Saturn Lakes (Chiniak): T.30S, R.18W, Sec. 18	Both lakes and access trails lie entirely on property owned by Lesnoi.
Lee Lake (Bell's Flats): T.28S, R.20W, Sec. 31 T.28S, R.21W, Sec. 36	Accessed from a Bell's Flats and Russian Creek Subdivision road. Lake and access trail lie entirely on property owned by the Kodiak Island Borough. Described as ADL 35153, State Pat. 7618 (Lot 1, USS 2539).
Long Lake (Woody Is.): T.28S, R.19W, Sec. 3 T.27S, R.19W, Sec. 34 T.27S, R.19W, Sec. 35	Lake is fronted by property owned by the Baptist Mission, DNR, BLM and Kodiak Island Borough. Public access, from a road, to the southwest end is allowed by the Baptist Mission. The road does not lie within a public use easement or right-of-way, except that portion crossing property owned by the Natives of Kodiak (near the dock) which is a 17B easement.
Lupine (Pasagshak Point): T.32S, R.20W, Sec. 2 T.31S, R.20W, Sec. 35	Southern 1/4 lies on DNR property, remainder of lake and access trail (from the Chiniak Road) lies on property owned by Lesnoi. Lesnoi is currently allowing public access to their land, with prior permission.
Southern Lake (Long Is.): T.28S, R.19W, Secs. 13 & 14	Lake and access lie entirely on property owned by Lesnoi. Leisnoi is currently allowing public access to their land, with prior permission.
Tanignak Lake (Woody Is.): T.28S, R.19W, Sec. 3 T.27S, R.19W, Sec. 34	Lake is fronted by property owned by the Baptist Mission and Kodiak Island Borough. Public access, from a road, to the southwest end is allowed by the Baptist Mission. The road does not lie within a public use easement or right-of-way, except that portion crossing property owned by the Natives of Kodiak (near the dock) which is a 17B easement.
Twin Lakes (Narrow Cape): T.32S, R.19W, Sec. 4	Lakes and access lie entirely on property owned by DNR.

Buskin River and Pasagshak River State Parks: The Division of Sport Fish began stocking chinook salmon smolt in the Buskin River in 1995 in order to increase the diversity of fishing opportunities on the road system, as well as generate 2,000 angler-days of fishing effort. In order to contribute to the maintenance of support facilities associated with the increased effort due to a chinook return, the Division of Sport Fish is paying for garbage removal and outhouse pumping in both Buskin and Pasagshak State Parks. Covering these expenses is one aspect of the Sport Fish Division's program designed to accommodate and monitor the return of chinook to the Buskin.

APPENDIX J. KMA HARVEST, CATCH AND PARTICIPATION DURING 1995, FROM STATEWIDE HARVEST SURVEY

Appendix J1.-Kodiak Area sport fish harvest and effort by fisheries and species, 1995.

	Anglers	Trips	Days Fished	KS	SS	LL	RS	PS	CS	DV AC	SH	RT	GR	SM	HA	RF	LC	RCL	OTHER
SALTWATER:																			
Boat - Chiniak Bay Area	4,950	11,256	13,698	759	2,281	0	427	1,311	59	131	0	0	0	0	5,467	2,273	570	0	439
Boat - Barren Islands	1,623	1,369	1,979	9	49	0	0	19	0	0	0	0	0	0	2,142	102	37	0	20
Boat - Ugak Bay	1,233	751	2,151	0	28	0	0	113	0	38	0	0	0	0	706	83	9	0	41
Boat - Other	2,413	3,225	4,824	26	185	0	301	143	22	179	0	0	0	0	2,726	590	186	0	101
Shoreline - Chiniak Bay Area	1,469	4,967	4,950	27	789	0	139	2,352	259	551	20	0	0	0	123	373	0	0	593
Shoreline - Afognak Island Area	2,823	4,585	8,593	308	1,850	0	1,059	471	0	89	0	0	0	0	2,732	704	121	0	243
Shoreline - Other	933	1,947	3,847	9	881	0	302	1,314	101	350	10	0	0	0	93	122	9	0	10
SALTWATER TOTAL	10,444[a]	28,100	40,042	1,138	6,063	0	2,228	5,723	441	1,338	30	0	0	0	13,989	4,247	932	0	1,447
FRESHWATER:																			
Buskin River	3,476	13,512	14,089	0	2,132	0	1,087	2,367	162	1,969	0	0	0	0	0	0	0	0	0
Pasagshak River	2,357	4,263	5,189	0	1,187	0	571	193	138	294	0	0	0	0	0	0	0	0	0
Karluk River and Lagoon	1,980	1,691	6,928	1,284	212	0	2,133	19	0	539	47	0	0	0	0	0	0	0	0
American River	1,370	2,779	3,267	0	794	0	0	688	81	631	0	0	0	0	0	0	0	0	0
Olds River (or Creek)	1,943	3,905	5,169	0	833	0	0	1,134	141	392	0	0	0	0	0	0	0	0	20
Red River (Ayakulik)	461	556	1,299	200	57	0	413	0	0	0	0	0	0	0	0	0	0	0	0
Saltery Cove Streams	527	1,105	1,368	0	685	0	652	19	0	307	0	0	0	0	0	0	0	0	0
Other Remote Streams	1,018	1,925	2,757	0	676	0	837	652	0	415	17	55	0	0	0	0	0	0	0
Other Road System Streams	944	2,961	3,379	0	387	0	0	1,131	18	153	0	0	0	0	0	0	0	0	0
Roadside Lakes	448	982	1,203	0	56	0	42	0	0	295	0	151	0	0	0	0	0	0	0
Other Lakes	376	361	839	0	154	0	31	0	0	136	0	77	0	0	0	0	0	0	0
FRESHWATER TOTAL	8,416[a]	34,040	45,487	1,484	7,173	0	5,766	6,203	540	5,131	64	283	0	0	0	0	0	0	20
GRAND TOTAL	14,693[a]	62,140	85,529	2,622	13,236	0	7,994	11,926	981	6,469	94	283	0	0	13,989	4,247	932	0	1,467

From: Howe et al. 1996. Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

[a] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J2.-Kodiak Area sport fish catch and effort by fisheries and species, 1995.

	Anglers	Trips	Days Fished	KS	SS	LL	RS	PS	CS	DV AC	SH	RT	GR	SM	HA	RF	LC	RCL	OTHER
SALTWATER:																			
Boat - Chiniak Bay Area	4,950	11,256	13,698	1,095	2,641	0	483	4,419	140	189	0	0	0	0	9,840	3,517	775	0	1,711
Boat - Barren Islands	1,623	1,369	1,979	9	59	0	0	56	0	0	0	0	0	0	5,560	168	84	0	92
Boat - Ugak Bay	1,233	751	2,151	0	28	0	0	460	0	115	0	0	0	0	954	129	9	0	61
Boat - Other	2,413	3,225	4,824	127	261	0	778	1,354	153	382	0	0	0	0	6,177	1,498	513	0	314
Shoreline - Chiniak Bay Area	1,469	4,967	4,950	27	1,223	0	222	6,100	620	2,080	28	0	0	0	235	718	0	0	929
Shoreline - Afognak Island Area	2,823	4,585	8,593	390	3,389	0	1,344	3,168	219	822	25	0	0	0	4,720	2,038	168	0	2,669
Shoreline - Other	933	1,947	3,847	103	1,109	0	646	2,926	101	1,082	20	0	0	0	112	291	9	0	50
SALTWATER TOTAL	10,444[a]	28,100	40,042	1,751	8,710	0	3,473	18,483	1,233	4,670	73	0	0	0	27,598	8,359	1,558	0	5,826
FRESHWATER:																			
Buskin River	3,476	13,512	14,089	0	3,505	0	2,159	6,988	373	7,736	149	65	0	0	0	0	0	0	0
Pasagshak River	2,357	4,263	5,189	499	1,808	0	1,059	1,115	281	708	0	0	0	0	0	0	0	0	1,499
Karluk River and Lagoon	1,980	1,691	6,928	3,897	580	0	5,224	28	0	3,414	793	294	0	0	0	0	0	0	0
American River	1,370	2,779	3,267	0	1,103	0	0	5,965	357	1,742	0	0	0	0	0	0	0	0	0
Olds River (or Creek)	1,943	3,905	5,169	0	1,571	0	0	4,561	567	959	0	0	0	0	0	0	0	0	20
Red River (Ayakulik)	461	556	1,299	1,083	208	0	751	9	0	183	453	58	0	0	0	0	0	0	0
Saltery Cove Streams	527	1,105	1,368	0	1,024	0	1,422	1,602	0	1,651	0	0	0	0	0	0	0	0	0
Other Remote Streams	1,018	1,925	2,757	9	1,642	0	2,717	1,818	120	3,366	157	1,231	0	0	0	0	0	0	62
Other Road System Streams	944	2,961	3,379	0	557	0	0	4,432	72	278	0	0	0	0	0	0	0	0	0
Roadside Lakes	448	982	1,203	0	56	0	62	48	0	458	9	357	9	0	0	0	0	0	0
Other Lakes	376	361	839	0	558	0	83	194	0	1,389	18	443	0	0	0	0	0	0	0
FRESHWATER TOTAL	8,416[a]	34,040	45,487	5,488	12,612	0	13,477	26,760	1,770	21,884	1,579	2,448	9	0	0	0	0	0	1,581
GRAND TOTAL	14,693[a]	62,140	85,529	7,239	21,322	0	16,950	45,243	3,003	26,554	1,652	2,448	9	0	27,598	8,359	1,558	0	7,407

From: Howe et al. 1996. Kodiak (Area Q): All Alaskan waters, including drainages, of the Kodiak and Afognak Island groups including the Barren and Trinity Islands.

[a] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J3.-Naknek River Drainage-Alaska Peninsula Area sport fish harvest and effort by fisheries and species, 1995.

	Anglers	Trips	Days Fished	KS	SS	RS	KO	PS	CS	LT	DV AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	OTHER
SALTWATER:																					
Boat - Dutch Harbor	1,008	1,513	2,225	0	56	326	0	75	0	0	44	0	0	0	0	0	0	1,334	205	0	30
Boat - Other	1,176	3,380	4,619	25	453	209	0	133	10	0	478	0	0	0	0	0	0	1,454	354	75	193
Shoreline	629	1,936	2,215	0	480	133	0	568	0	0	345	0	0	0	0	0	0	8	0	0	81
SALTWATER TOTAL	2,062[a]	6,829	9,059	25	989	668	0	776	10	0	867	0	0	0	0	0	0	2,796	559	75	304
FRESHWATER:																					
Cold Bay Area (including Russel Creek)	443	1,557	1,733	28	509	312	0	136	153	0	600	0	0	0	0	0	0	0	0	0	0
Naknek River below Rapids Camp	2,024	3,787	5,782	578	462	468	0	35	111	0	269	370	184	0	48	0	0	0	0	0	0
Naknek River above Rapids Camp	3,448	7,571	10,845	3,576	1,327	457	0	0	62	0	87	86	0	0	58	0	2,128	0	0	0	0
Brooks River	1,739	2,113	4,047	19	141	567	0	19	0	0	0	9	0	0	0	0	0	0	0	0	0
American Creek	398	545	609	0	0	11	0	0	0	0	96	0	0	0	0	0	0	0	0	0	0
Other Streams	1,618	4,200	5,136	380	550	112	0	94	73	0	551	41	17	0	0	0	0	0	0	0	0
Ugashik System	486	721	905	19	346	96	0	0	0	66	77	0	0	0	0	0	0	0	0	0	0
Becharof System	567	563	1,083	9	48	556	0	0	0	0	0	12	26	0	0	0	633	0	0	0	0
Other Systems	114	794	737	0	47	87	67	290	0	0	546	19	0	0	0	0	0	0	0	0	0
Naknek Lake - Bay of Islands	447	471	857	45	0	89	0	0	0	10	11	0	0	0	59	0	0	0	0	0	0
Naknek Lake - Other	405	739	931	9	68	66	0	0	0	27	117	40	0	0	0	0	0	0	0	0	0
Brooks Lake	421	1,356	1,289	0	39	56	0	0	0	140	0	90	0	0	0	0	0	0	0	0	0
Other Lakes	436	716	1,106	0	154	272	0	0	0	0	571	0	0	0	0	0	0	0	0	0	0
FRESHWATER TOTAL	8,806[a]	25,133	35,060	4,663	3,691	3,149	67	574	399	243	2,925	667	227	0	165	0	2,761	0	0	0	0
GRAND TOTAL	10,394[a]	31,962	44,119	4,688	4,680	3,817	67	1,350	409	243	3,792	667	227	0	165	0	2,761	2,796	559	75	304

From: Howe et al. 1996. Naknek River Drainage-Alaska Peninsula (Area R): All Alaskan waters, including drainages, between Cape Douglas and the community of Naknek; including the Naknek River drainage, and the Aleutian Island chain. Does not include Cape Douglas.

[a] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.

Appendix J4.-Naknek River Drainage-Alaska Peninsula Area sport fish catch and effort by fisheries and species, 1995.

	Anglers	Trips	Days Fished	KS	SS	RS	KO	PS	CS	LT	DV AC	RT	GR	WF	NP	BB	SM	HA	RF	LC	OTHER
SALTWATER:																					
Boat - Dutch Harbor	1,008	1,513	2,225	0	94	525	0	75	0	0	246	0	0	0	0	0	0	2,628	373	93	449
Boat - Other	1,176	3,380	4,619	25	1,911	594	0	385	100	0	1,453	0	0	0	0	0	0	3,092	1,118	494	846
Shoreline	629[a]	1,936	2,215	73	1,960	256	0	1,137	164	0	982	0	0	0	0	0	0	8	0	0	377
SALTWATER TOTAL	2,062[a]	6,829	9,059	98	3,965	1,375	0	1,597	264	0	2,681	0	0	0	0	0	0	5,728	1,491	587	1,672
FRESHWATER:																					
Cold Bay Area (including Russel Creek)	443	1,557	1,733	189	859	312	0	1,297	549	0	3,268	0	0	0	0	0	0	0	0	0	0
Naknek River below Rapids Camp	2,024	3,787	5,782	1,308	1,488	2,364	0	146	412	57	1,416	10,363	1,613	92	80	0	0	0	0	0	0
Naknek River above Rapids Camp	3,448	7,571	10,845	4,906	2,204	585	0	68	538	17	953	3,996	326	45	80	0	2,128	0	0	0	0
Brooks River	1,739	2,113	4,047	119	1,061	3,699	0	469	0	112	200	6,091	734	0	0	0	0	0	0	0	61
American Creek	398	545	609	0	0	525	0	0	0	10	5,704	1,767	0	0	0	0	0	0	0	0	0
Other Streams	1,618	4,200	5,136	878	1,918	480	0	1,211	930	0	7,724	1,978	840	0	0	0	0	0	0	0	344
Ugashik System	486	721	905	170	891	325	0	0	22	114	1,309	297	1,263	0	150	0	0	0	0	0	0
Becharof System	567	563	1,083	18	546	1,134	0	169	197	17	1,339	743	1,118	0	0	0	633	0	0	0	0
Other Systems	114	794	737	0	311	109	67	881	0	0	1,288	131	0	0	0	0	0	0	0	0	0
Naknek Lake - Bay of Islands	447	471	857	54	0	89	0	0	0	241	76	1,342	0	0	547	0	0	0	0	0	0
Naknek Lake - Other	405	739	931	9	418	408	0	0	0	168	616	805	0	0	50	0	0	0	0	0	0
Brooks Lake	421	1,356	1,289	9	212	720	0	0	0	583	77	1,610	9	0	0	0	0	0	0	0	0
Other Lakes	436[a]	716	1,106	0	269	546	25	0	0	102	2,775	1,752	0	0	0	0	0	0	0	0	0
FRESHWATER TOTAL	8,806[a]	25,133	35,060	7,660	10,177	11,296	92	4,241	2,648	1,421	26,745	30,875	5,903	137	907	0	2,761	0	0	0	405
GRAND TOTAL	10,394[a]	31,962	44,119	7,758	14,142	12,671	92	5,838	2,912	1,421	29,426	30,875	5,903	137	907	0	2,761	5,728	1,491	587	2,077

From: Howe et al. 1996. Naknek River Drainage-Alaska Peninsula (Area R): All Alaskan waters, including drainages, between Cape Douglas and the community of Naknek; including the Naknek River drainage, and the Aleutian Island chain. Does not include Cape Douglas.

[a] Angler totals may not equal sum of sites due to some anglers fishing at more than one site.